E. S. B. – Type A
Vol. I

EDISON STORAGE BATTERY

Type "A" Cells

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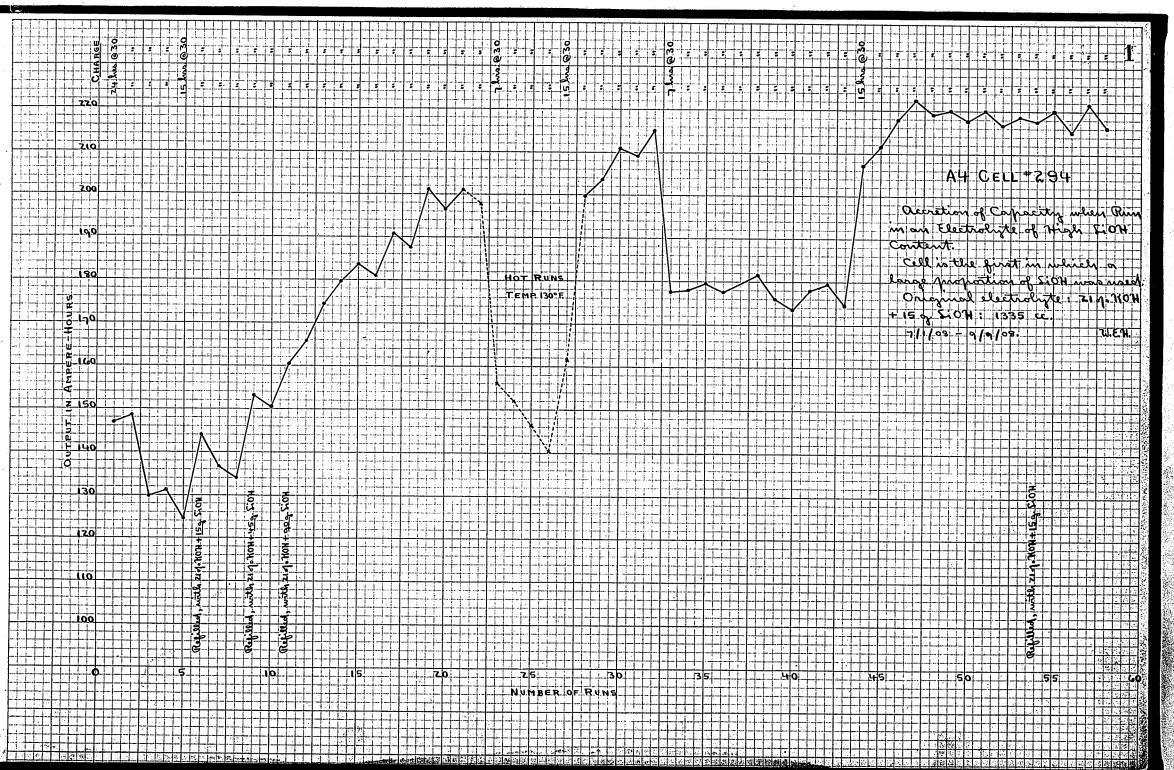
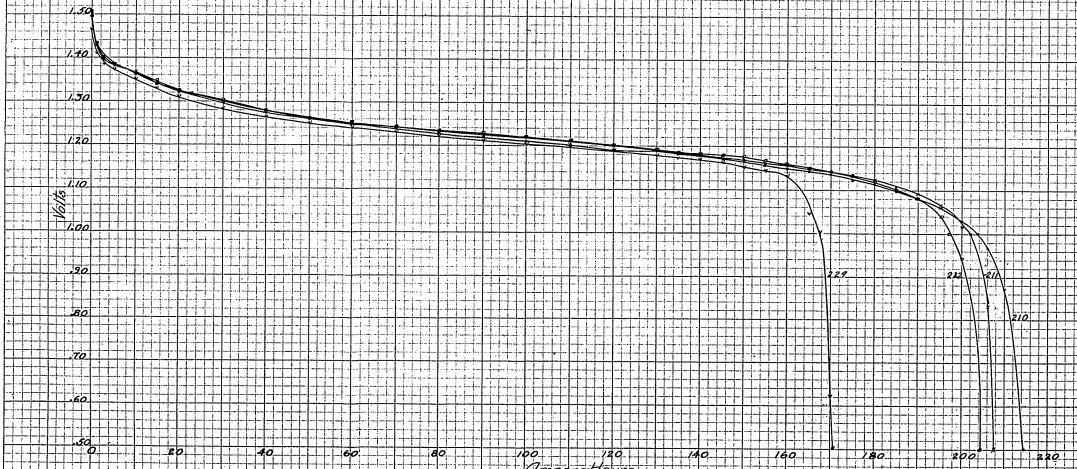

Output in Ampere-Hours
Number of Runs
Hot Runs
Temp 130°F
Charge
24 hrs @ 30
15 hrs @ 30
7 hrs @ 30
Discharge
60 Amps with 21% KOH + 15g LiOH
60 Amps with 21% KOH + 15g LiOH
60 Amps with 21% KOH + 15g LiOH
60 Amps with 21% KOH + 15g LiOH
A4 Cell #294
Duration of Capacity when Run
on an Electrolyte of 21% KOH
Content.
Cell in the first instance a
long Impregnation of 5% KOH measured.
Original Electrolyte: 21% KOH
+ 15g LiOH: 1355 cc
7/11/09 - 9/9/09.
W.E.H.

O.A. Cells

Normal Overcharge Test at Special-Electrolyte Cells after 25 Hot Runs.
Run #33 : 9/17/08 Charge—13 hours at 30 amps. discharge rate 30 amperes.

				0-H to 1 V	0-H to .5 V
•	Cell # 210	Electrolyte 10.6% KOH + 10.9 g LiOH		203.7	214.7
x	" # 211	" 15.1% " + 10.3 g "		202.0	207.7
o	" # 212	" 19.2% " + 9.8 g "		196.0	204.5
v	" # 229	" 2.10% " + 13 g "		167.5	170.7

Edison Laboratory Test O.K. — W.E.H. Plotted by A.C.

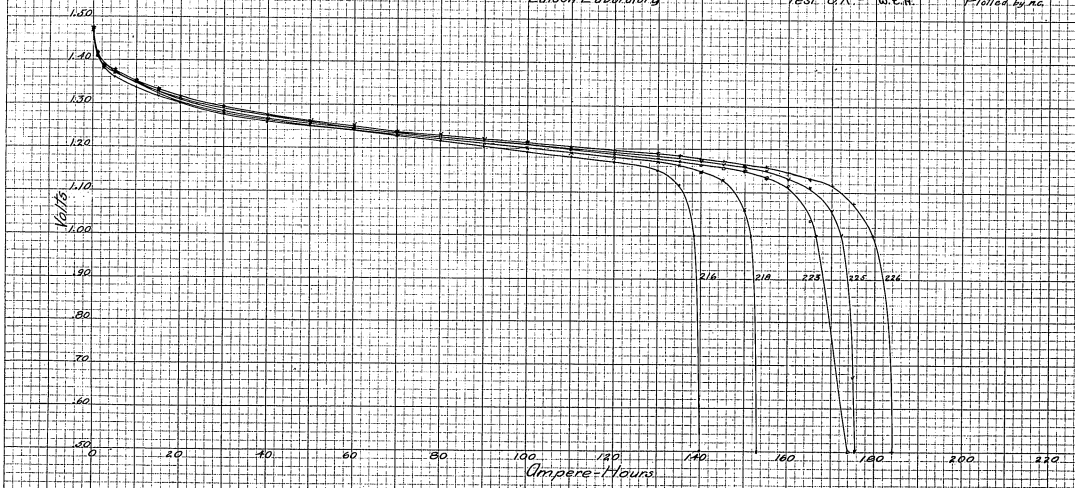


0.4 Cells

Normal Overcharge Test of Special Electrolyte Cells after 25 Hot Runs.
Run #33. 9/17/20 Charge: 15 hours at 30 amps. Discharge rate, 30 amperes

								At Hour	At Hour
•	Cell #	216	Electrolyte	21%	KOH +	15 g.	LiOH.	1385	1400
x	" #	218	"	"	"	30 g.	"	1515	1580
o	" #	223	"	"	"	45 g.	"	1665	1690
v	" #	225	"	"	"	60 g.	"	1782	1767
+	" #	226	"	"	"	75 g.	"	1787	1940

Edison Laboratory. Test O.K. - W.C.N. Plotted by H.C.



O.A Cells.

Life-Curves of Cells which were Tested Hot for durability: Showing capacity to 1.00 volt at 30-ampere discharge-rate when charged 15 hours at 30 amperes.

Hot runs made at 130°F, -charging + hours at 30 amperes.

Cell # 210 Electrolyte 10.6% KOH + 10.2 g LiOH

× " # 211 - # 214 " 15.9% " + 10.3 g "

○ " # 212 - # 215 " 19.2% " + 9.8 g "

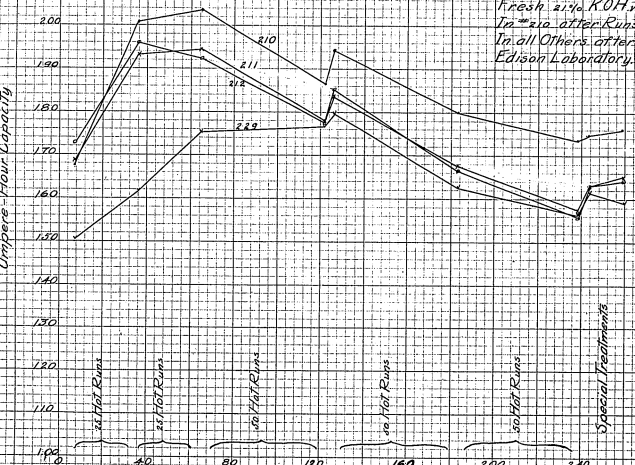
✓ " # 229 - # 230 " 24.0% " + 9.5 g "

Fresh 21% KOH was put in cells as follows:

In # 210 after Runs # 65, 122, 141, 238. 8/20/08 To 2/17/09

In all Others after Runs # 122, 238.

Edison Laboratory. Test O.K. - W.E.H. Plotted by nc.

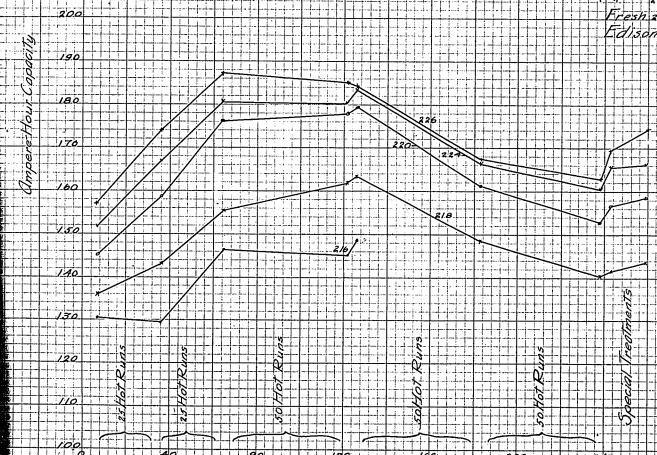


0.4 Cells

Life-Curves of Cells which were Tested Hot for Durability:
Showing capacity to 1.10 V at 30-ampere discharge-rate when charged 5 hours at 30 amperes.
Hot runs made at 130° F.-charging 7 hours at 30 amperes.

•	Cell No. 216	Electrolyte 21% KOH + 1.5g LiOH.
x	" " 218 — " 219	Electrolyte 21% KOH + 3.0g LiOH.
o	" " 220 — " 223	Electrolyte 21% KOH + 4.5g LiOH.
v	" " 224 — " 225	Electrolyte 21% KOH + 6.0g LiOH.
+	" " 226 — " 228	Electrolyte 21% KOH + 7.5g LiOH.

Fresh 21% KOH was put in cells of the Runs "122" and "230."
Edison Laboratory, 8/26/00 to 2/17/00. To-F.O.K.-W.E.M. Plotted by H.C.



A-4 Cell # 210.

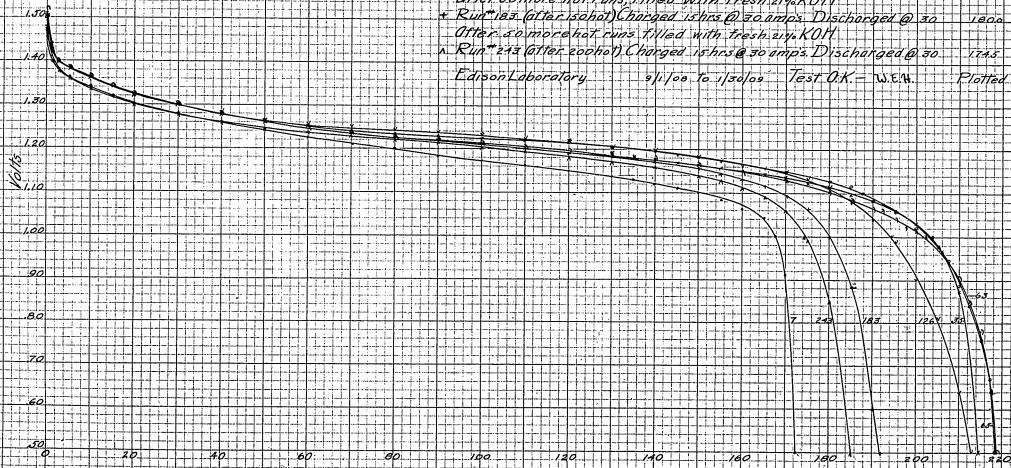
Electrolyte – 18.4% KOH + 10g grams LiOH (1530 cc)

				O.H to V.	O.H to 5 V.
•	Run #7.	Charged 15 hours @ 30 amperes	Discharged @ 30 amps.	167.5	172.5
×	" #35.	(after 15 hot) Charged 15 hrs. @ 30 amps.	"	203.7	214.7
⊃	" #65.	(after 30 hot) " " " " "	"	202.5	219.0

Filled with 21% KOH

○	Run #65	Charged 15 hrs. @ 30 amps.	Discharged @ 30	203.5	218.7
	After 30 more hot runs, Filled with fresh 21% KOH				
v	Run #126.	(after 100 hot) Charged 15 hrs. @ 30 amps.	Discharged @ 30	194.5	213.0
	After 30 more hot runs, Filled with fresh 21% KOH				
+	Run #183.	(after 150 hot) Charged 15 hrs @ 30 amps.	Discharged @ 30	180.0	122.0
	After 30 more hot runs Filled with fresh 21% KOH				
∧	Run #243	(after 200 hot) Charged 15 hrs @ 30 amps.	Discharged @ 30	174.5	185.0

Edison Laboratory. 9/1/09 to 1/30/09 Test O.K. – W.E.M. Plotted by A.C.



O A Cell # 211

Electrolyte: 15% KOH + 10 grams LiOH

| | | |

O-4 Cell # 216

Electrolyte - 21% KOH + 15 grams Li OH (1730 c.c.)

		O-H To 1.V	OH To .5V
•	Run # 7 Charged 15 hrs. @ 30 amps. Discharged at 30	170.5	132.
x	" " 95 (after 25 hot) " " " " " " "	138.5	140.
○	" " 65 (after 50 hot) " " " " " " "	146.5	148.7

After 50 more hot runs, cell was filled with 21% KOH

∨	Run # 226 (after 100 hot) Charged 15 hrs @ 30 amps. Discharged at 30	148.7	143.5

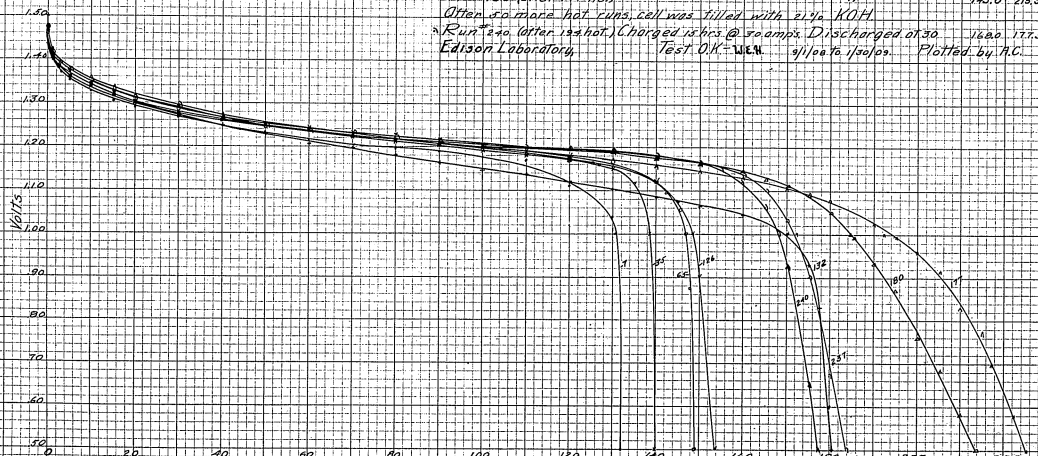
105 grams of Li OH was added to Cell

+	Run # 132 Charged 15 hrs @ 30 amps. Discharged at 30	179.0	180.5
△	" " 180 (after 144 hot) " " " " " " "	145.0	213.5

After 50 more hot runs, cell was filled with 21% KOH

△	Run # 240 (after 192 hot.) Charged 15 hrs @ 30 amps. Discharged at 30	164.0	177.5

Edison Laboratory Test O.K. - W.E.N. 9/1/08 to 1/30/09 Plotted by H.C.

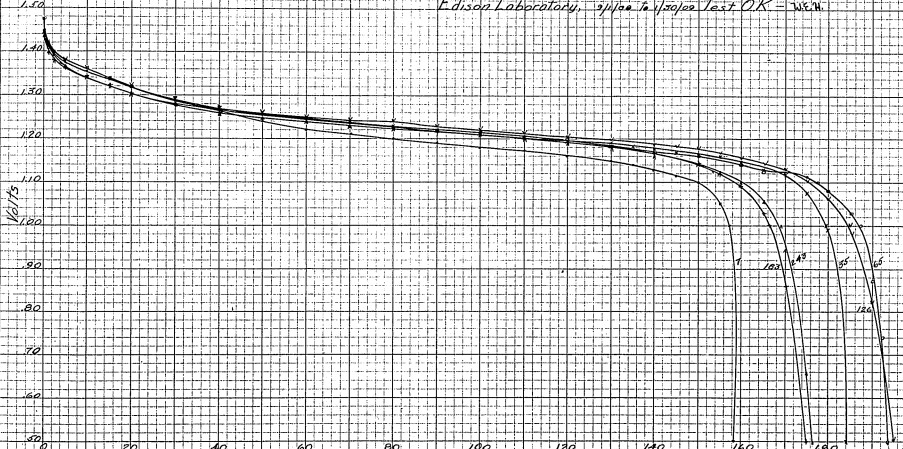


O-A Cell #226

Electrolyte: 21% KOH + 15 g LiOH

		O-H to V	OH to V
Run #7	Charged 15 hrs @ 30 amps. Discharged @ 30	1.572	1.586
" 35 (after 25 hot)	" " " " " "	1.797	1.824
" 63 (after 30 hot)	" " " " " "	1.872	1.935
After 30 more hot runs, cell was filled with 21% KOH			
Run #126 (after 100 hot)	Charged 15 hrs @ 30 amps. Discharged @ 30	1.845	1.916
" 183 (after 150 hot)	" " " " " "	1.885	1.956
After 50 more hot runs, cell was filled with 21% KOH			
Run #243 (after 200 hot)	Charged 15 hrs @ 30 amps. Discharged @ 30	1.690	1.765

Edison Laboratory, 3/1/20 to 3/30/20 Test OK – W.S.H. Plotted by A.C.

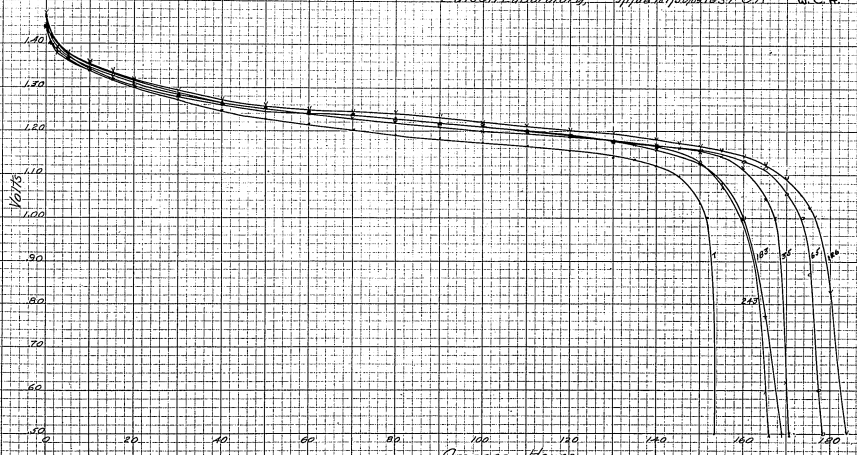


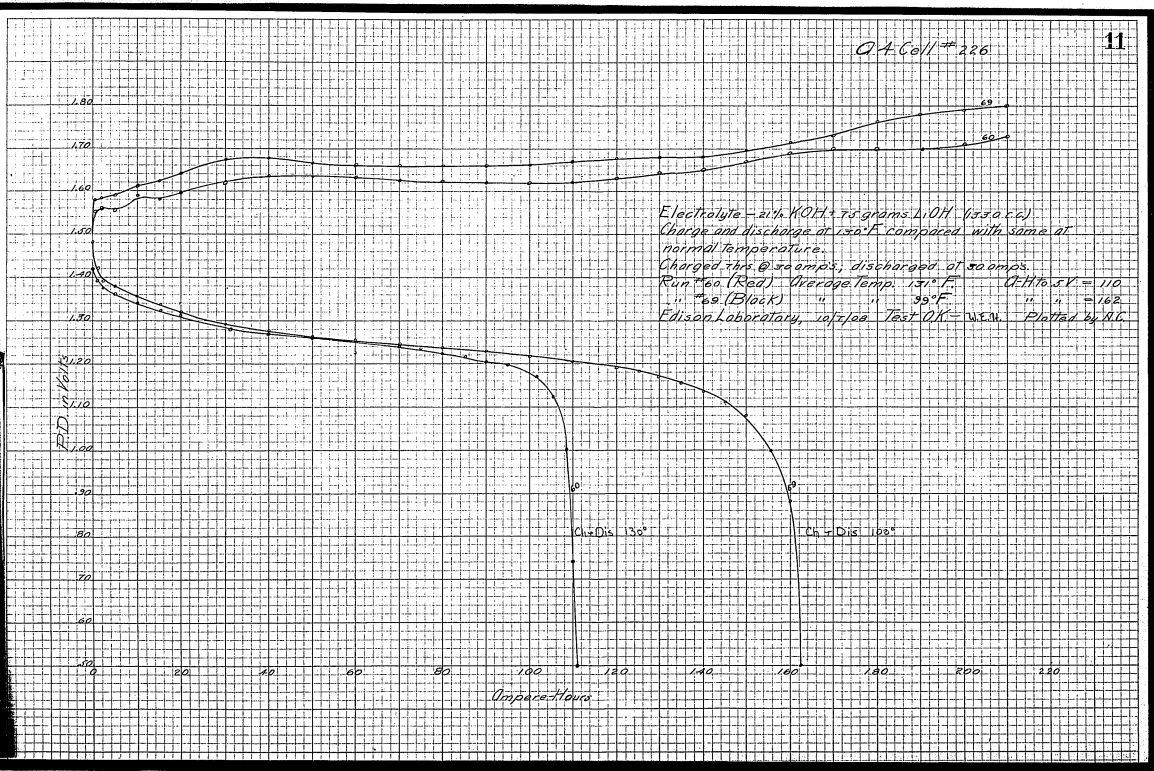
O4-Cell #229

Electrolyte: 24% KOH + 15 g LiOH

		At Volt	At No. 5
•	Run #7 Charged 15 hrs @ 30 amps. Discharged @ 30	141.7	133.2
X	" #35 (after 25 hot) Charged 15 hrs @ 30 amps. Discharged @ 30	167.5	170.7
o	" #65 (after 50 hot) " " " " " "	173.5	178.5
	After 50 more hot runs, cell was filled with 21% KOH		
V	Run #126 (after 100 hot) Charged 15 hrs @ 30 amps. Discharged @ 30	176.5	184.7
+	" #163 (after 150 hot) " " " " " "	160.5	169.0
	After 50 more hot runs, cell was filled with 21% KOH		
Λ	Run #243 (after 200 hot) Charged 15 hrs @ 30 amps. Discharged @ 30	139.5	166.0

Edison Laboratory. 9/11/08 to 1/30/09 Test OK — W.E.H. Plotted by H.C.



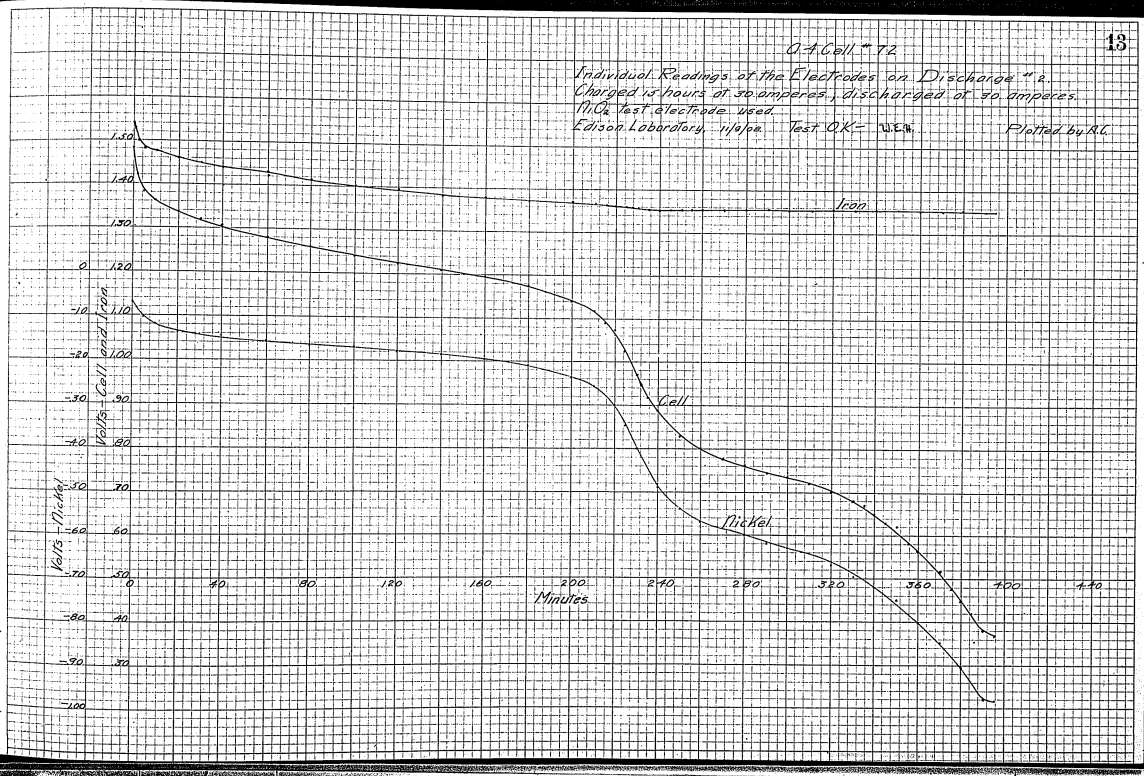

Q.A. Cell # 226
Electrolyte – 21¼ KOH + 7.5 grams LiOH (333 c.c.)
Charge and discharge at 130° F. compared with same at normal temperature.
Charged 7 hrs. @ 30 amps., discharged at 30 amps.
Run #60. (Red) Average Temp. 131° F. Q.H to 1.V. = 110
" #69. (Black) " " 99° F. " " = 162
Edison Laboratory, 10/5/08 Test OK – W.E.H. Plotted by R.C.
P.D. in Volts
Ampere-Hours
Ch – Dis 130°
Ch – Dis 102°
69
60
60
69

04 Cell #72

Cell ran 2200 miles in the test-car with an electrolyte low in LiOH after which 21% KOH + 70g LiOH was put in.

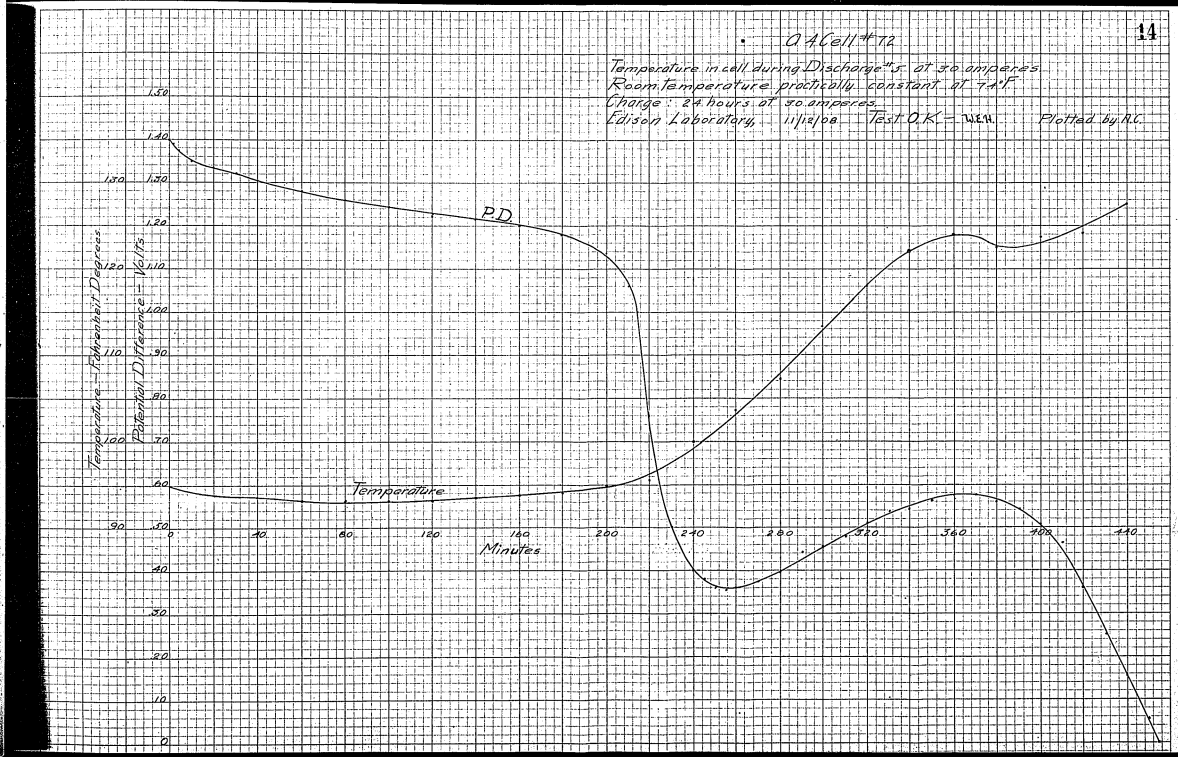
Lab run #2 is the fifth run after filling with the new solution.

| | | |


O-1 Cell # 72
Individual Readings of the Electrodes on Discharge # 2.
Charged 13 hours at 30 amperes, discharged at 30 amperes.
Ni O2 Test Electrode used.
Edison Laboratory, 11/6/08 Test OK— W.E.H. Plotted by N.L.
Iron
Cell
Nickel
Volts Cell Iron
Volts Nickel
Minutes
1.50
1.40
1.30
1.20
1.10
1.00
.90
.80
.70
.60
.50
.40
.30
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
0
40
80
120
160
200
240
280
320
360
400
440

O A Cell # 72

Temperature in cell during Discharge "s" at 30 amperes
Room Temperature practically constant at 74°F.
Charge: 24 hours at 30 amperes
Edison Laboratory, 11/12/08 Test O.K. – W.E.M. Plotted by N.C.

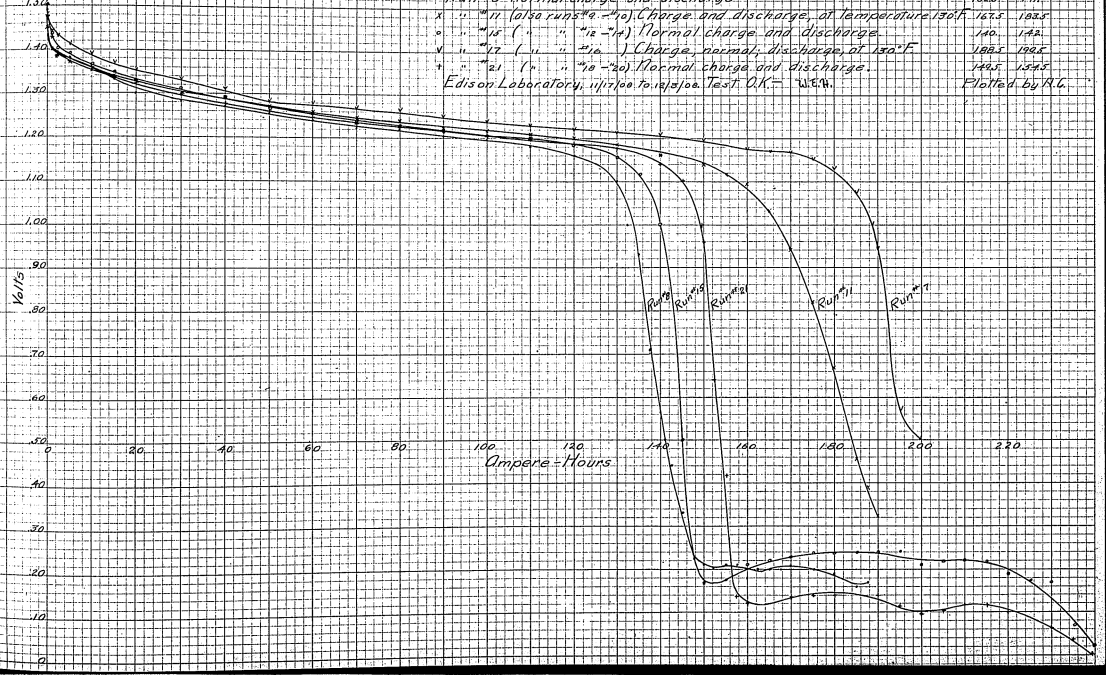


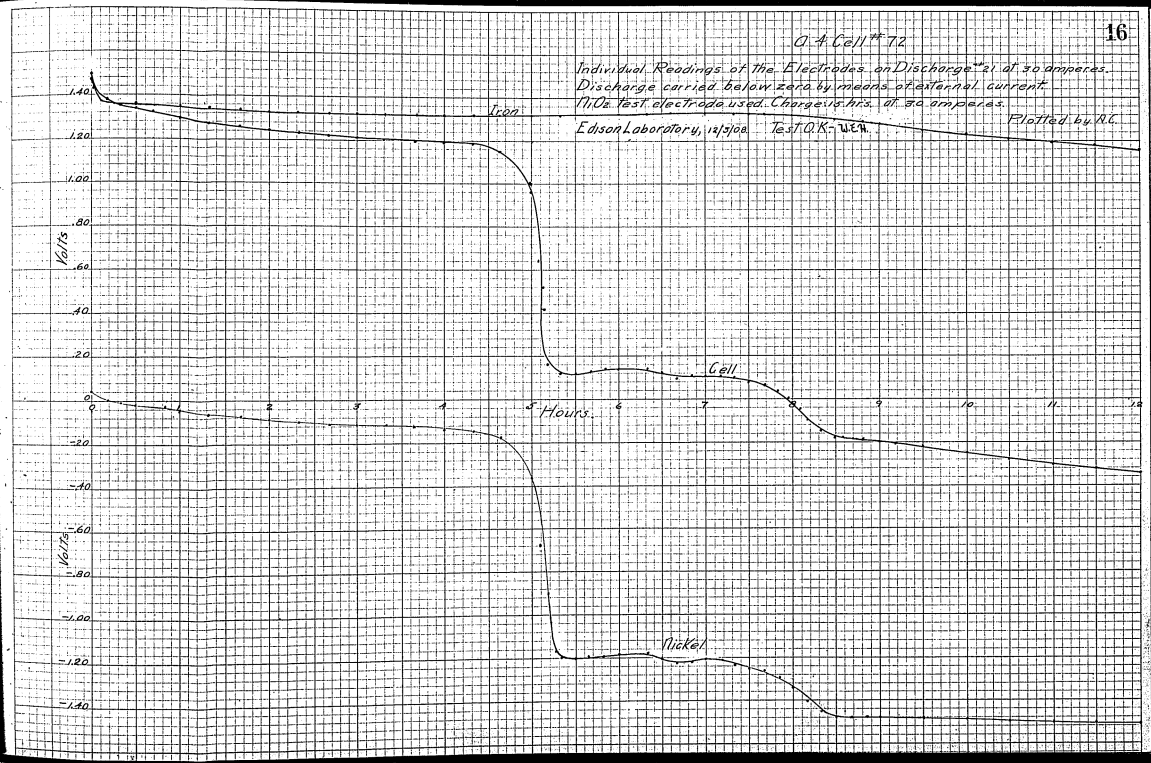
O-A Cell #T2

Discharges at 30 amperes following 15-Hour, 30-Ampere Charges. O-H 6.1 V. O-H 6.5 V.

•	Run #8. Normal charge and discharge.	132.5	141.
x	" " #11. (also runs #9 - #10.) Charge and discharge, at temperature 130°F.	162.5	193.5
○	" " #15 (" " " #12 - #14.) Normal charge and discharge.	140.	142.
▽	" " #17 (" " " #16) Charge, normal discharge at 130°F.	188.5	192.5
†	" " #21 (" " " #18 - #20.) Normal charge and discharge.	149.5	154.5

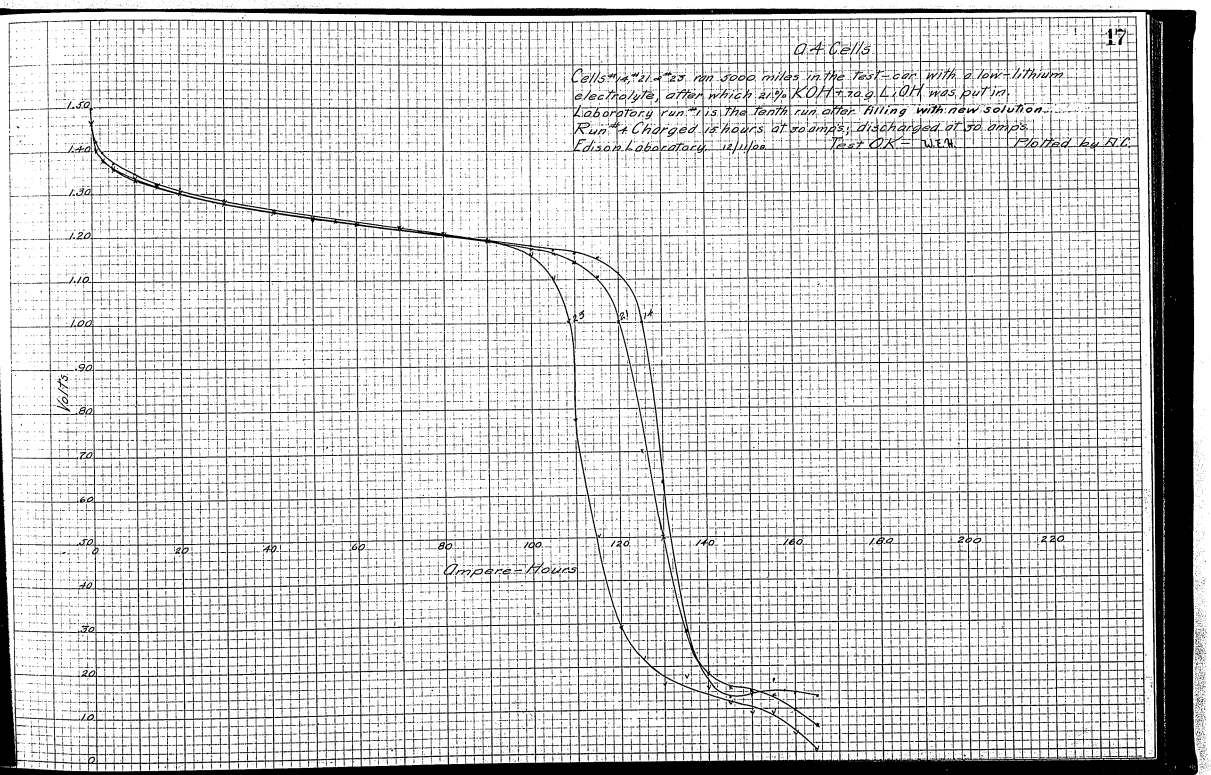
Edison Laboratory, 11/17/00 to 12/2/00. Test O.K. — W.E.H. Plotted by N.L.




O.4 Cell № 72
Individual Readings of the Electrodes on Discharge at 30 amperes.
Discharge carried below zero by means of external current.
11.0% test electrode used. Charge 6½ hrs. at 30 amperes.
Edison Laboratory, 12/3/08 Test O.K. - WEH.
Plotted by A.L.
Iron
Cell
Nickel
Hours.
Volts
1.40
1.20
1.00
.80
.60
.40
.20
0
-.20
-.40
-.60
-.80
-1.00
-1.20
-1.40
0
1
2
3
4
5
6
7
8
9
10
11
12

0.4 Cells

Cells #14, #21, & #23 ran 3000 miles in the Test-car with a low-lithium electrolyte, after which 21% KOH + 20 g LiOH was put in.
Laboratory run #15 the tenth run after filling with new solution.
Run #4 Charged 15 hours at 30 amps; discharged at 30 amps.
Edison Laboratory 12/11/08 Test OK - WEH Plotted by RC

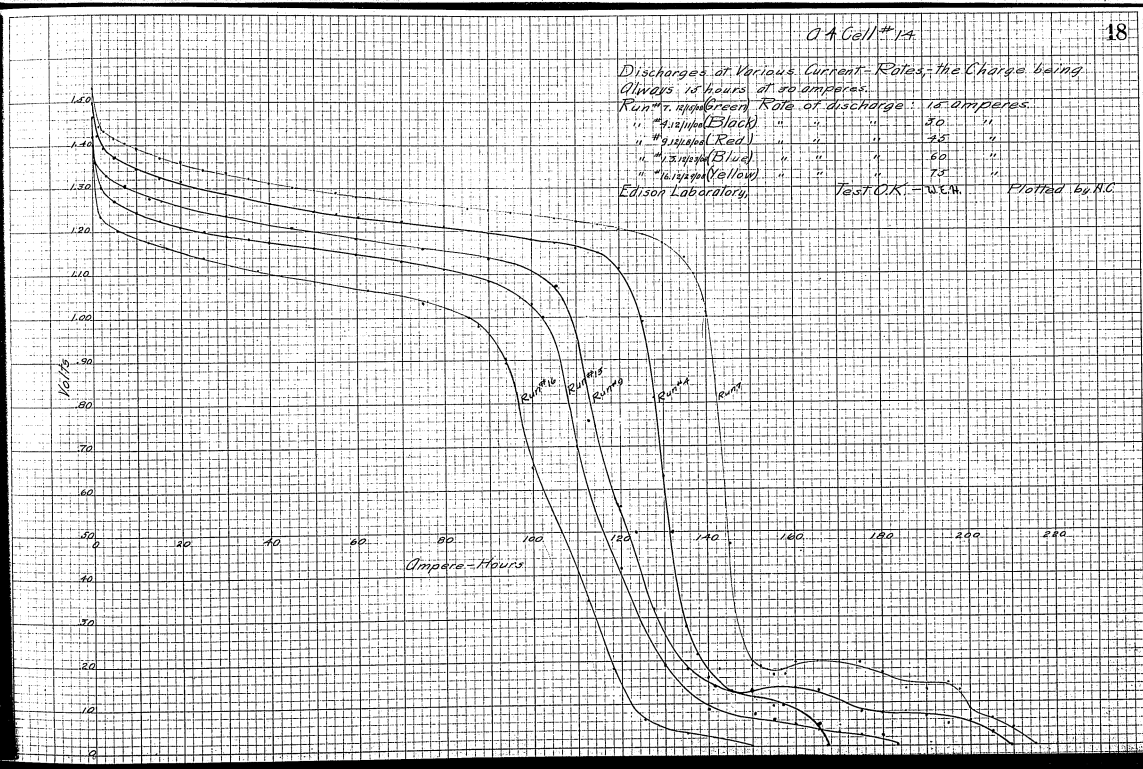


O.A. Cell #14.

Discharges at Various Current-Rates, the Charge being Always: 15 hours at 30 amperes.

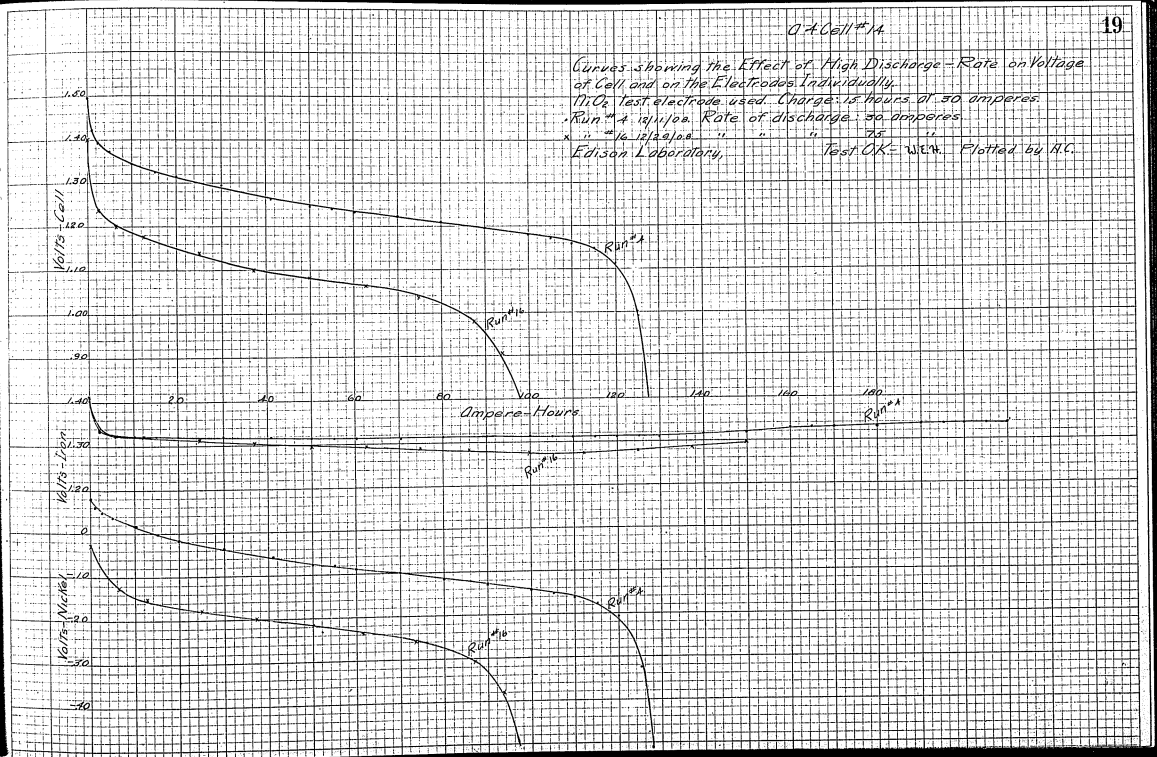
Run #7. 12/12/08 (Green) Rate of discharge: 15 amperes.
" #9. 12/15/08 (Black) " " " 30 "
" #9. 12/18/08 (Red) " " " 45 "
" #13. 12/23/08 (Blue) " " " 60 "
" #16. 12/29/08 (Yellow) " " " 75 "

Edison Laboratory, Test O.K. — W.E.H. Plotted by H.C.



O-A Cell #14.

Curves showing the Effect of High Discharge-Rate on Voltage of Cell and on the Electrodes Individually.
Ni.O2 test electrode used. Charge: 15 hours at 30 amperes.
Run #4 13/11/08. Rate of discharge: 30 amperes.
× " #16 12/2/08. " " " 75 "
Edison Laboratory, Test O.K.- W.L.H. Plotted by H.C.



O-A Cells.

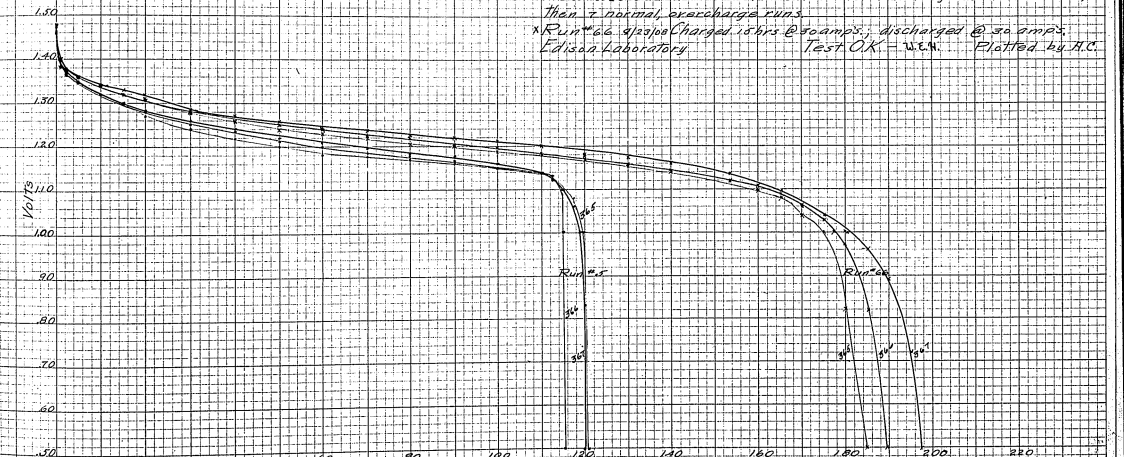
#365 Electrolyte 27% KOH + 15.2 g. LiOH
" 366 " 24% " " 9. "
" 367 " 21.9% " " 9. "

On runs #1-5 cells were charged 24 hours at 30 amps. Fresh electrolyte like the original was put in after run #2. On run #4 the charge was 15 hrs @ 30 amperes.

• Run #5. 7/29/00 Charged 15 hrs. at 30 amperes; discharged at 30 amperes. Cells then had 28 overcharge runs during which 45.6 g of LiOH was added in 9 installments. After that they had 25 normal runs. Then 7 normal overcharge runs.

X Run #66 9/23/00 Charged 15 hrs @ 30 amps; discharged @ 30 amps.

Edison Laboratory. Test O.K. — W.E.N. Plotted by H.C.

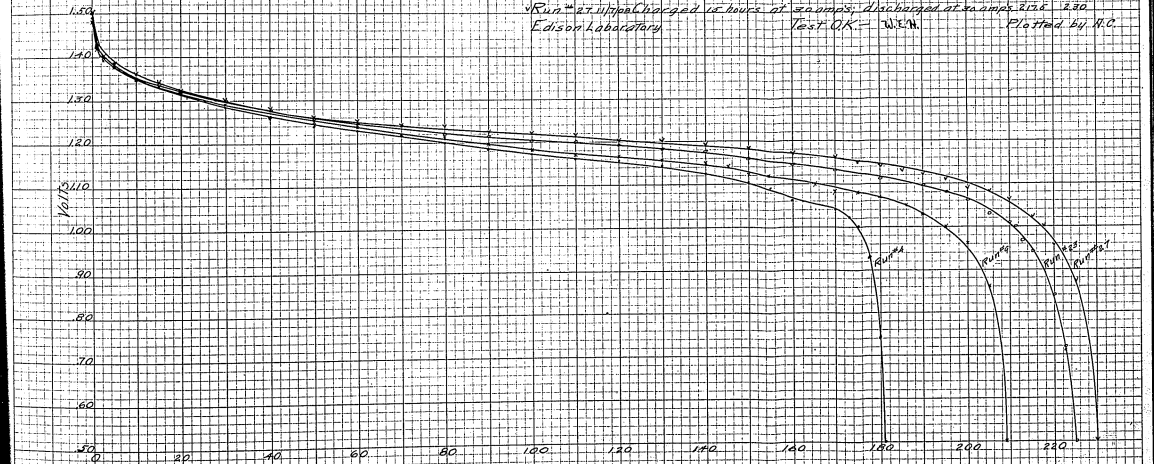


O.A Cell # 375

Electrolyte: 21% KOH + 120 g LiOH

Runs #1 - #3	Charged 15 hours at 30 amps; discharged at 30 amps.	0H Test	0H Test
Run #4 10/8/08	" " " " " " " " "	175	181
Cell had 3 hot runs and one normal overcharge run.			
x Run #5 10/13/08	Charged 15 hours at 30 amps; discharged at 30 amps	195	209
Cell had several overcharge runs and 3 hot runs.			
o Run #23 10/27/08	Charged 15 hours at 30 amps; discharged at 30 amps	207.7	225
Cell stood charged 7 days; Then 21% KOH was put in			
Runs #24 - #26 Normal overcharge tests.			
v Run #27 11/7/08	Charged 15 hours at 30 amps; discharged at 30 amps	212.6	230

Edison Laboratory. Test OK. W.E.H. Plotted by H.C.

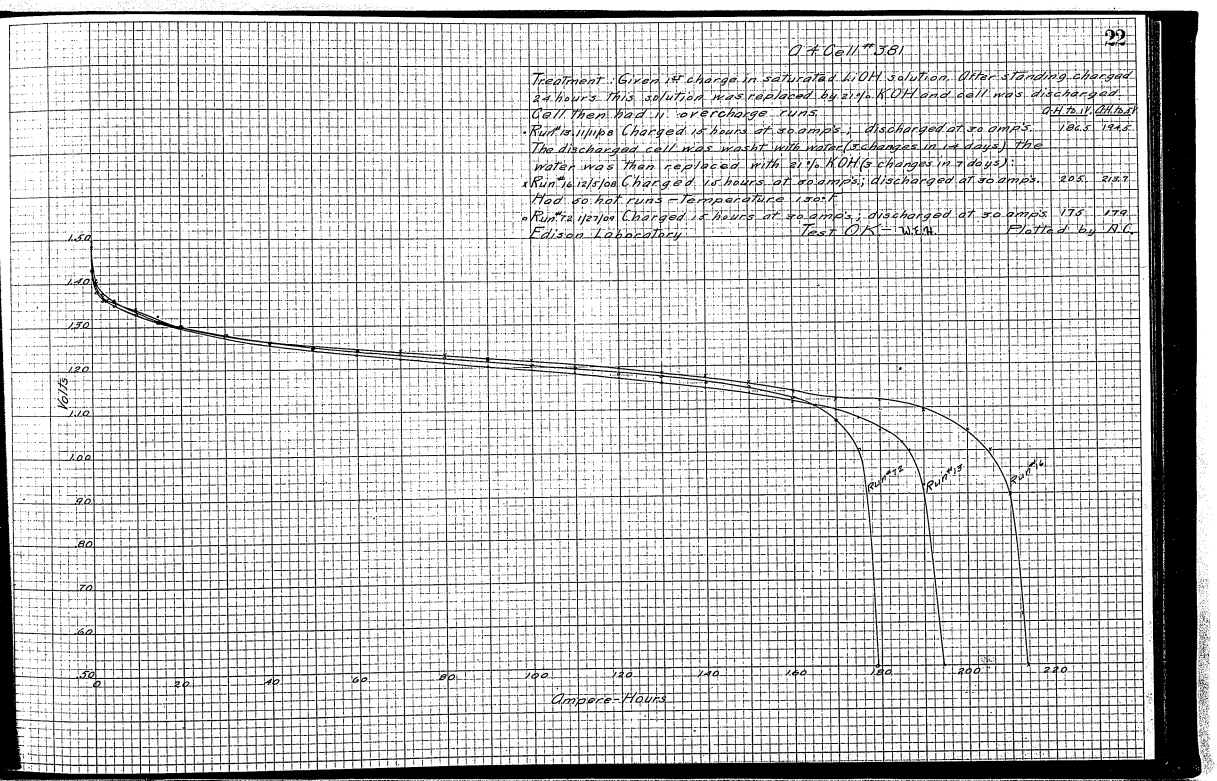


O # Cell # 381

Treatment: Given 1st charge in saturated LiOH solution. After standing charged 24 hours this solution was replaced by 21% KOH and cell was discharged. Cell then had 11 overcharge runs.

			AH to 1V	AH to 0
1 Run # 11	11/11/00	Charged 15 hours at 30 amps.; discharged at 30 amps.	186.5	194.5
		The discharged cell was washt with water (5 changes in 24 hrs.) the water was then replaced with 21% KOH (5 changes in 7 days).		
2 Run # 12	12/5/00	Charged 15 hours at 30 amps; discharged at 30 amps.	205.	218.7
		Had 50 hot runs - Temperature 120° F.		
3 Run # 13	1/27/00	Charged 15 hours at 30 amps.; discharged at 30 amps	175.	179.

Edison Laboratory. Test OK — W.E.H. Plotted by A.C.



O.A. Cell #384

Electrolyte: 21% KOH + 120 g LiOH

Runs #1 - 2, Charged 15 hrs at 30 amps, discharged at 30 amps.

Runs #3 - 6, Cell cooled by water: average Temperature 74° F. Charged 15 hours at 30 amperes, discharged at 30 amperes.

Run #7 Charged 15 hours at 30 amps. discharged at 30 amps.

Run #8 " " " " " " " " "

Run #9 " " " " " " " " "

Edison Laboratory, 10/27/09. Ballistype Test. O.K. - W.E.H. Plotted by R.C.

	OH to LiOH	LiOH to H2O
Run # 2 :	170.5	175.5
Run # 6 :	185.	206.5
	206.	217.
	200.	206.5

O-4 Cell #368

Electrolyte, 21% KOH + 120g LiOH.

														O-11 Volts	O-1 Volts
Run #1	Charged	18	hrs.	at	15	amps.	Discharged	at	30	amps.				212.2	214.1
" #2-4	"	"		"	15	"	"	"	30	"	"	"	7.5	"			
X " #5	"	"		"	"	"	"	"	"	"	"	"	3.0	"		192.	212.
" #6-10	"	"		"	"	"	"	"	"	"	"	"	"	"			
O " #11	"	"		"	"	"	"	"	"	"	"	"	"	"		211.	224.

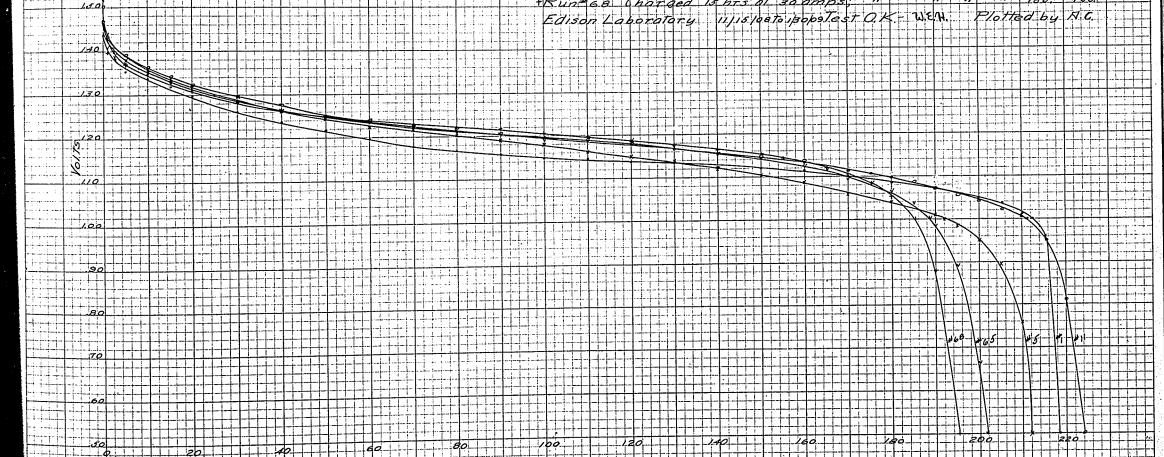
Had 40 hot runs.

√Run #65 Charged 18 hrs at 30 amps, " " " " " 189. 201.5

Put in 21% K.O.H.

√Run #68 Charged 18 hrs at 30 amps; " " " " " 185. 195.

Edison Laboratory 11/15/16 To Boonton O.K. - W.E.H. Plotted by N.C.



O A Cell # 389

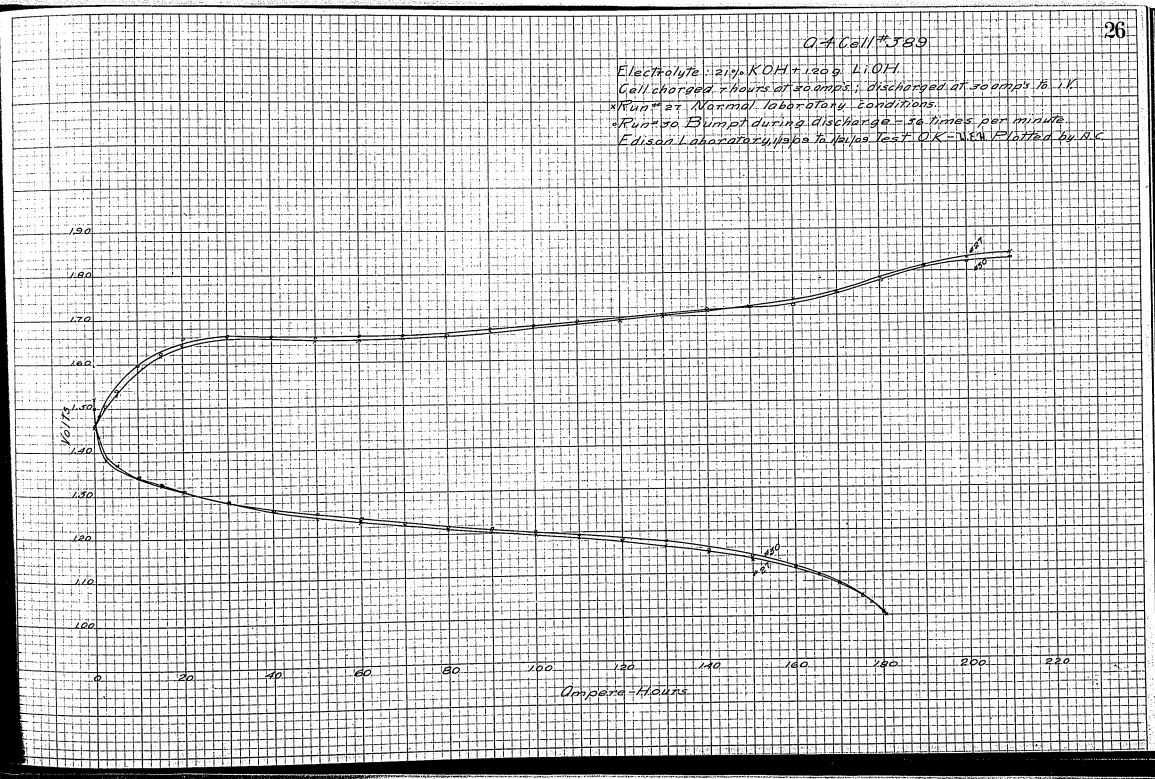
Electrolyte : 21% KOH + 120g LiOH.

	O.H. to II	O.H. to I
•Run #18 Charged 15 hrs. at 30 amps : discharged at 30 amps.	209	228.3
Bumpt in a machine 65,980 Times, (325 hours).		
xRun #19 Charged 15 hrs. at 30 amps : discharged at 30 amps.	209	220.7
Bumpt 925,370 times more, (417 hours)		
•Run #23 Charged 15 hrs. at 30 amps : discharged at 30 amps.	207	219.

Edison Laboratory, 1/19/08 To 1/28/08 test O.K. – W.E.H. Plotted by R.C.

O-A Cell #389

Electrolyte: 21% KOH + 1.209 LiOH
Cell charged 7 hours at 30 amps.; discharged at 30 amps to 1 V.
*Run #27 Normal laboratory conditions.
*Run #30 Bumped during discharge - 16 times per minute.
Edison Laboratory, Glen Ridge, N.J. Test OK - W.E.M. Plotted by A.C.



O-H Cell #393

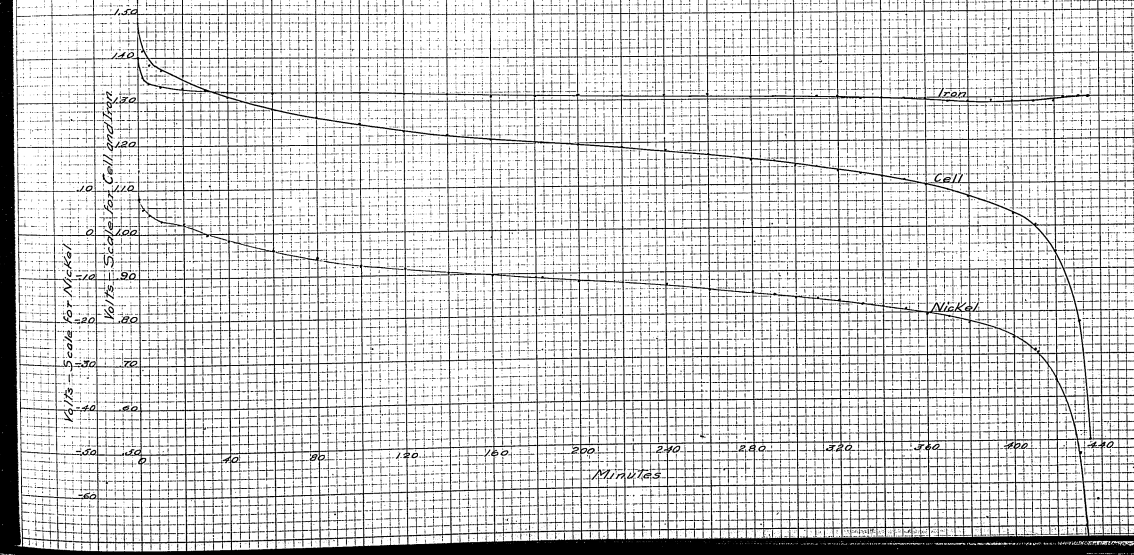
Electrolyte: 21 % KOH + 1.5 g LiOH

	O-H No. 11	O-H No. 21
Run #9. Charged 15 hours at 30 amps., discharged at 30 amps.	164.5	182.7
Bumpt in a machine 31,600 times, (605 hours)		
" #11 Charged 15 hours at 30 amps., discharged at 30 amps.	147.5	149.
Bumpt in a machine 106,240 times, (611 hours)		
" #15 Charged 15 hours at 30 amps., discharged at 30 amps.	143.5	146.5

Edison Laboratory, 12/26/11 & 1/6/12. Test. O.K. - W.E.H. Plotted by R.C.

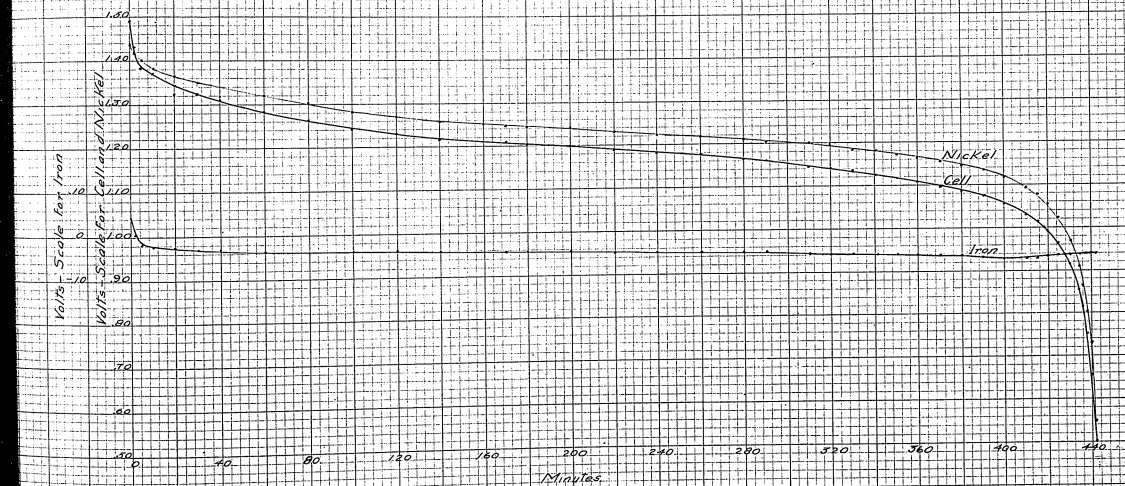
A 4 Cell #394

Electrolyte: 21% KOH + 120 g LiOH.
Individual readings taken with a Ni_2O_3 test-electrode, on discharge (#19) at 30 amperes. Cell was charged 18 hours at 30 amperes.
Edison Laboratory 12/8/08 Test OK - W.H.N. Plotted by BC



0.4 Cell #394

Individual readings taken with a Fe. test electrode, on discharge (4 th) at 30 amperes. Cell was charged 15 hrs. at 30 amperes.
Edison Laboratory. 12/12/08. Test O.K. WNP Plotted by H.C.



0.4 Cell #392

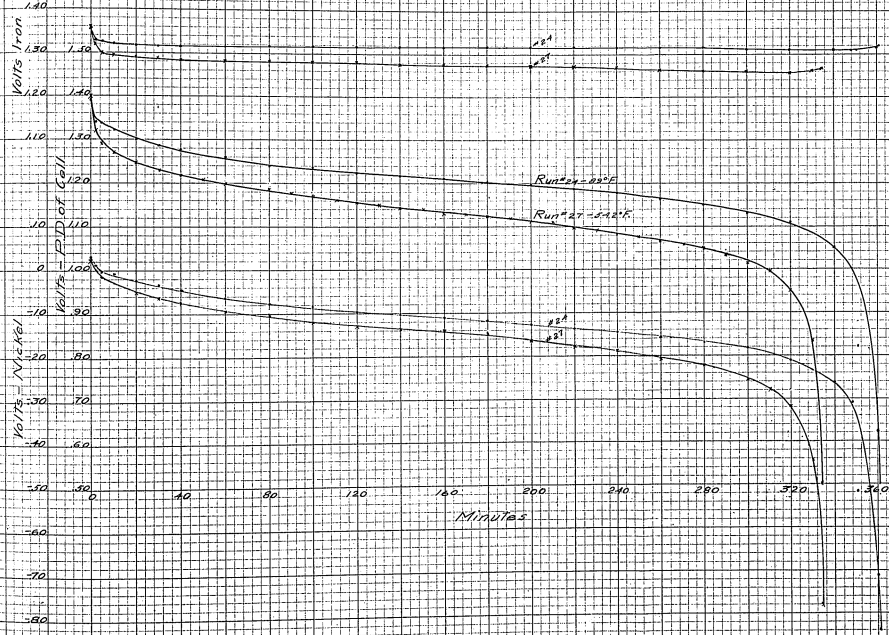
Cell discharged at 30 amps, commencing 2 hours after abnormal charge of 7 hrs. at 30 amps.

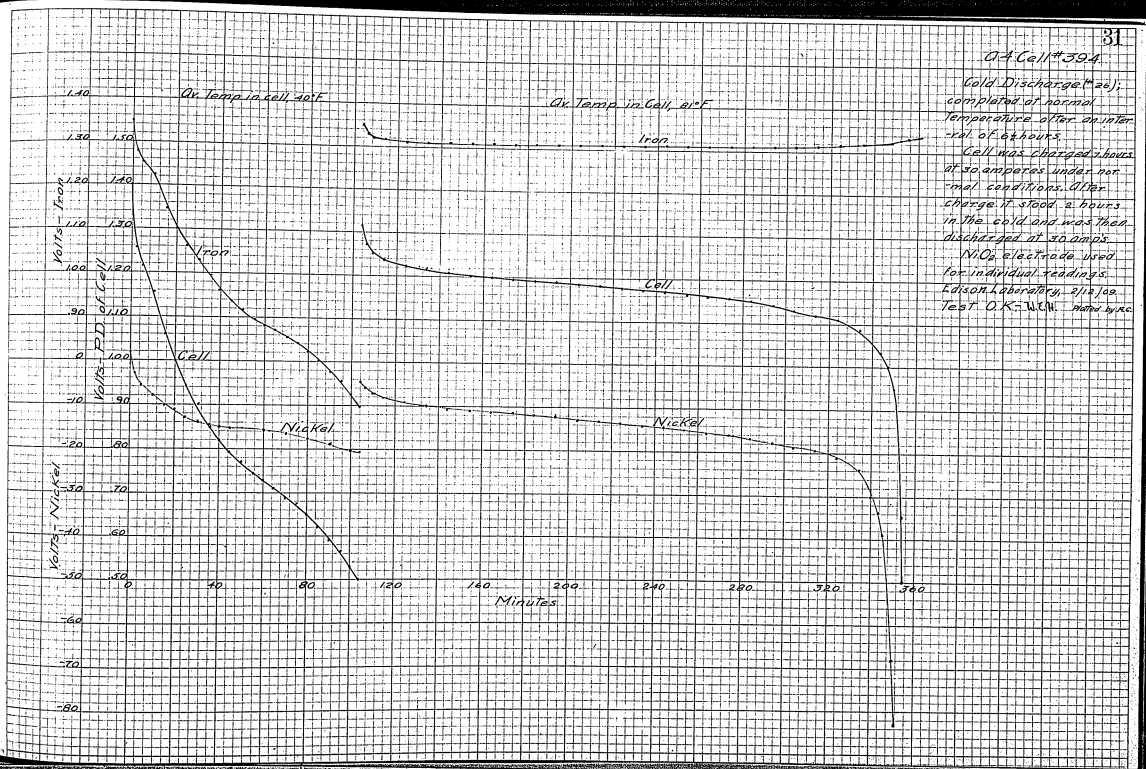
Discharge #24, 2/10/09, Average temp. 69°F.

Discharge #27, 2/13/09, Average temp. 142°F.

NiO_2 electrode used for individual readings.

Edison Laboratory, Test O.K.—W.T.S. Plotted by W.C.





O-A Cell #394

Cold Discharge (#20); completed at normal Temperature after an interval of 64 hours.

Cell was charged 7 hours at 30 amperes under normal conditions. After charge it stood 2 hours in the cold and was then discharged at 30 amps.

Ni Oz electrode used for individual readings.

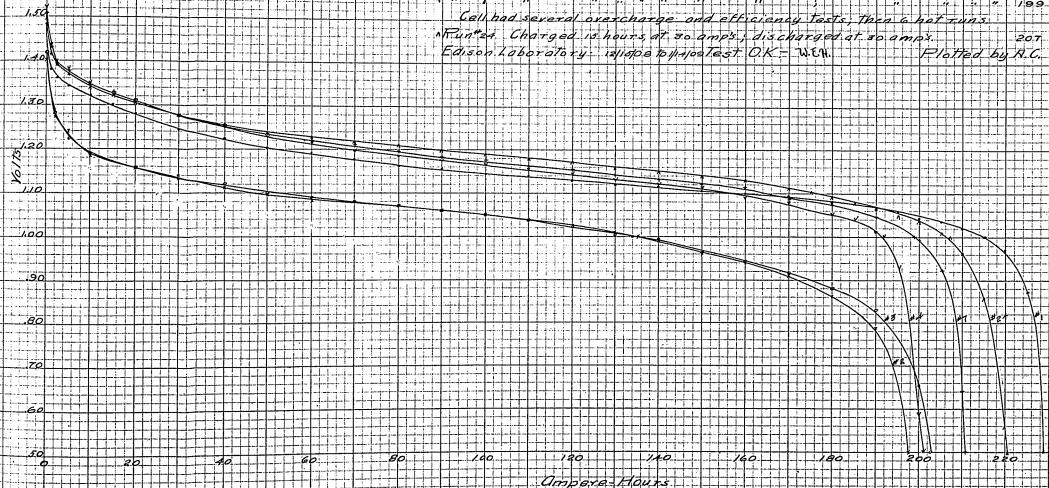
Edison Laboratory 2/13/09

Test O.K. - W.C.H. Plotted by R.C.

A4 Cell #393

Electrolyte: 21% KOH + 20 g LiOH.

	Ah in	Ah out
• Run #1. Charged 24 hrs. at 15 amps; discharged at 30 amperes.	215	228.7
On the next five runs, cell was in air for the high-rate part of charge, and in cooling water for the low-rate part, then in air again for the discharge.		
x Run #2. Charged 16 hrs. at 60 amps. + 6 hrs. at 15 amps; discharged at 60 amps.	135	197.5
○ " #3 " " " " " " " " " " "	174	206.5
v " #4 " 18 " " 30 " (normally); " " " 30 "	191.5	201
+ " #7 " " " " " " " " " " "	189	210.7
Cell had several overcharge and efficiency tests; then a hot run.		
^ Run #24. Charged 15 hours at 30 amps; discharged at 30 amps.	207	220.5
Edison Laboratory. Voltage before test OK - W.E.M.	Plotted by R.C.	



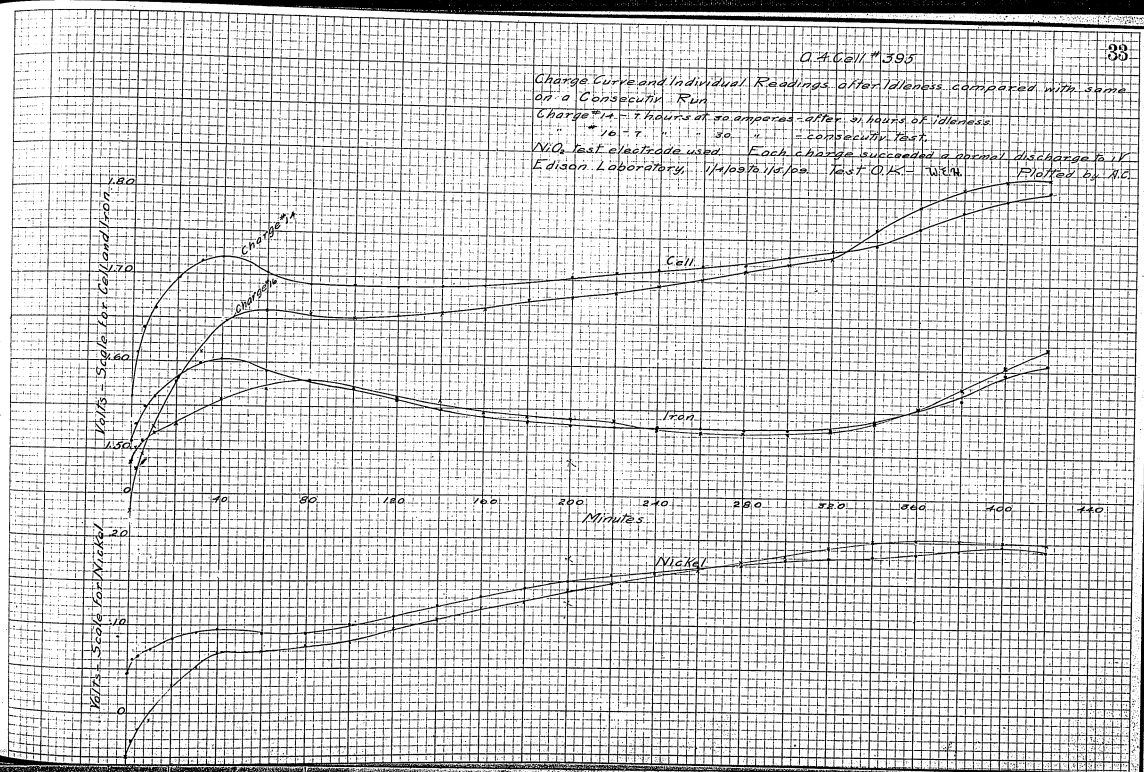
O.A. Coil # 395

Charge Curve and Individual Readings after Idleness compared with same on a Consecutive Run

Charge # 14 – 7 hours at 30 amperes – after 91 hours of Idleness.
" " 16 – 7 " " 30 " – consecutive test.

NiO_2 test electrode used. Each charge succeeds a normal discharge to 1V

Edison Laboratory. 1/14/09 to 1/15/09. Test O.K. – W.C.H. Plotted by N.C.



O.A. Cell #395

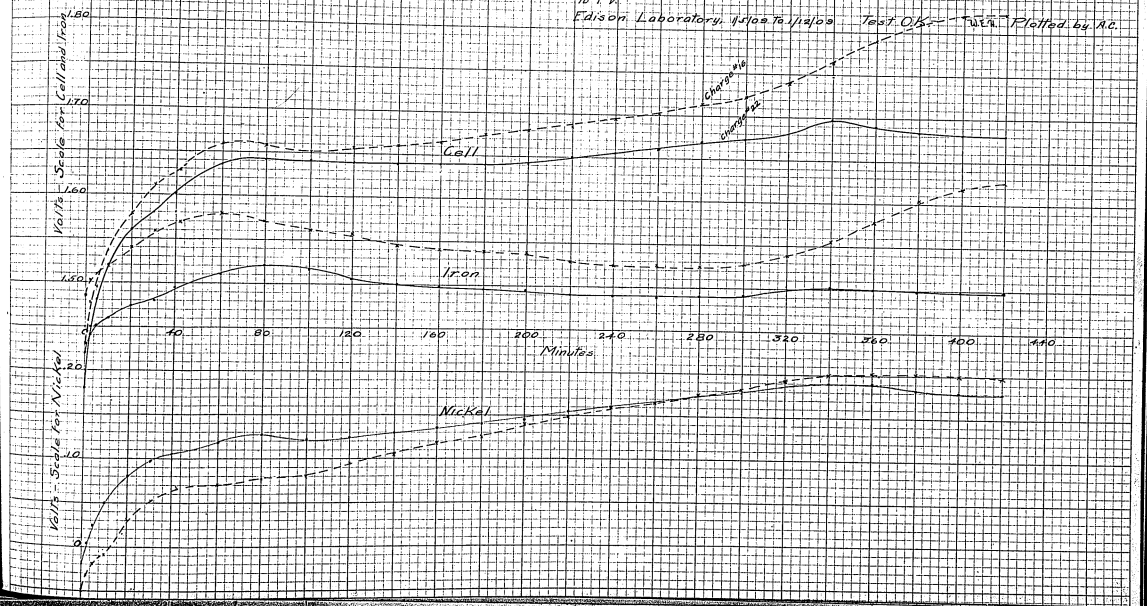
Charge Curve and individual Readings at High Temperature, compared with same on a Normal Run.

x Charge #16 - 7 hours at 30 amperes; normal test; average temp. 92°F.

" " #22 - 7 " " 30 " hot run " " 120°F.

NiO_2 test electrode used. Each charge succeeded a normal discharge to 1 V.

Edison Laboratory, 1/30 to 1/31/09 Test O.A. Plotted by H.C.



A-4 Cell #396

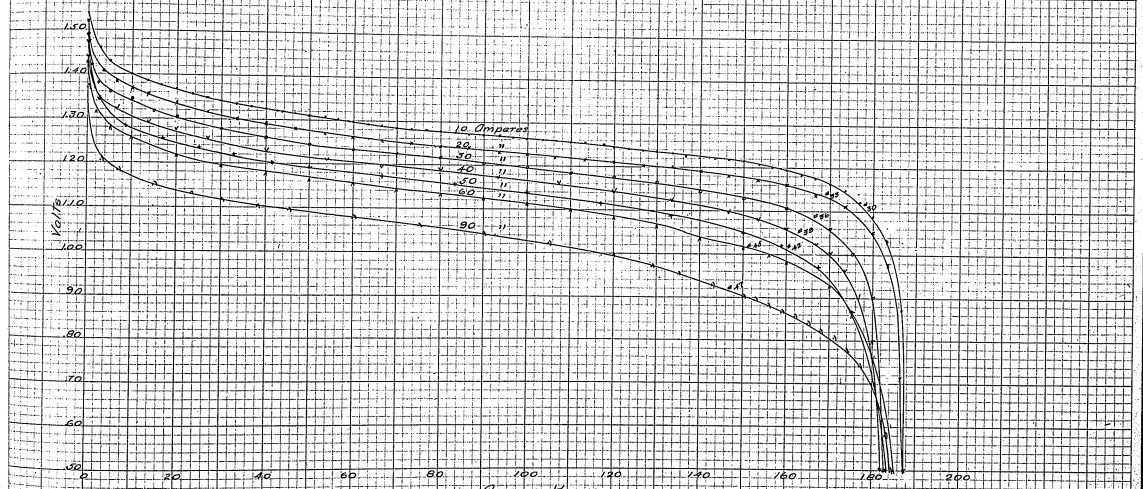
Discharges at Various Rates - the charge being constantly 2 hours at 30 amperes

Three runs at each rate (except at 30 amperes) were made, the last being used here in plotting.

Electrolyte: 21% KOH + 120 grams LiOH

Runs #30-47. 1/22/09 to 2/4/09.

Edison Laboratory. Test O.K. - W.H. Plotted by A.C.



A-4 Cell #396

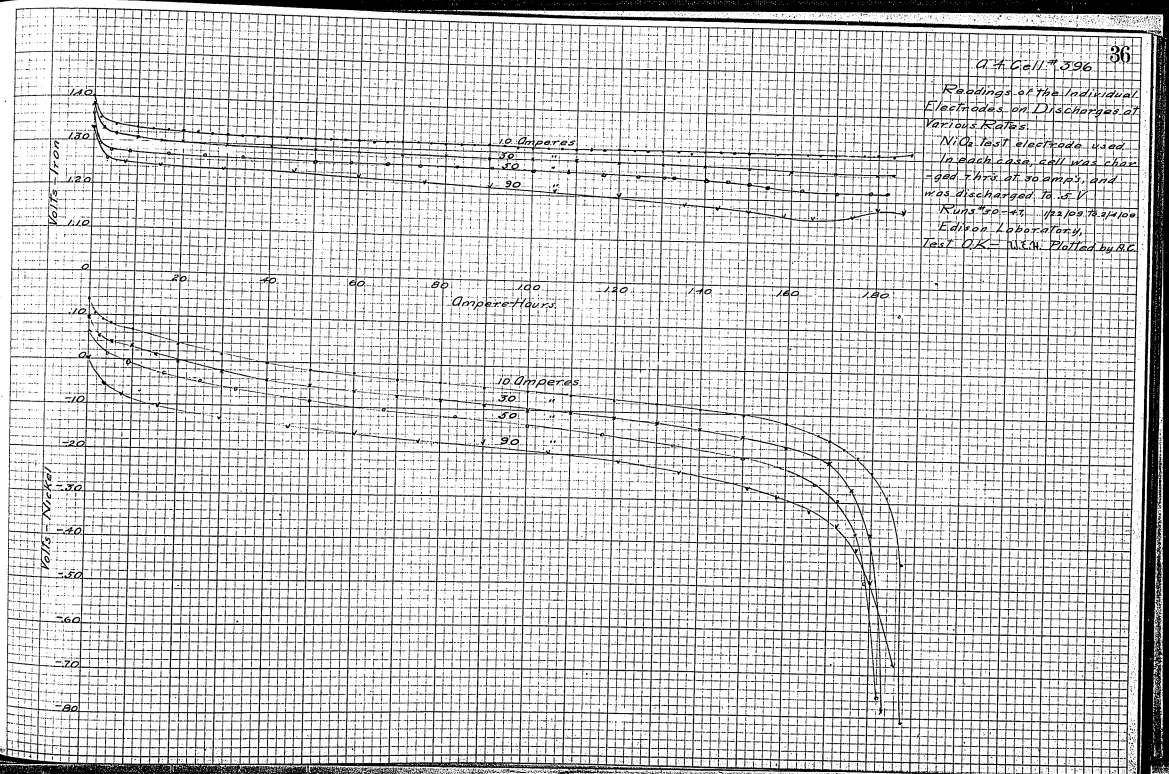
Readings of the individual Electrodes on Discharges at Various Rates.

Ni Oxide test electrode used. In each case cell was charged thru at 30 amps. and was discharged to 1.5 V.

Runs #30 - #37 12/29/09 to 3/4/10

Edison Laboratory,

Test O.K. — W.E.N. Plotted by R.C.



O.A. Cell No. 796.

Cell Temperature when Discharged in the Open at Various Rates.

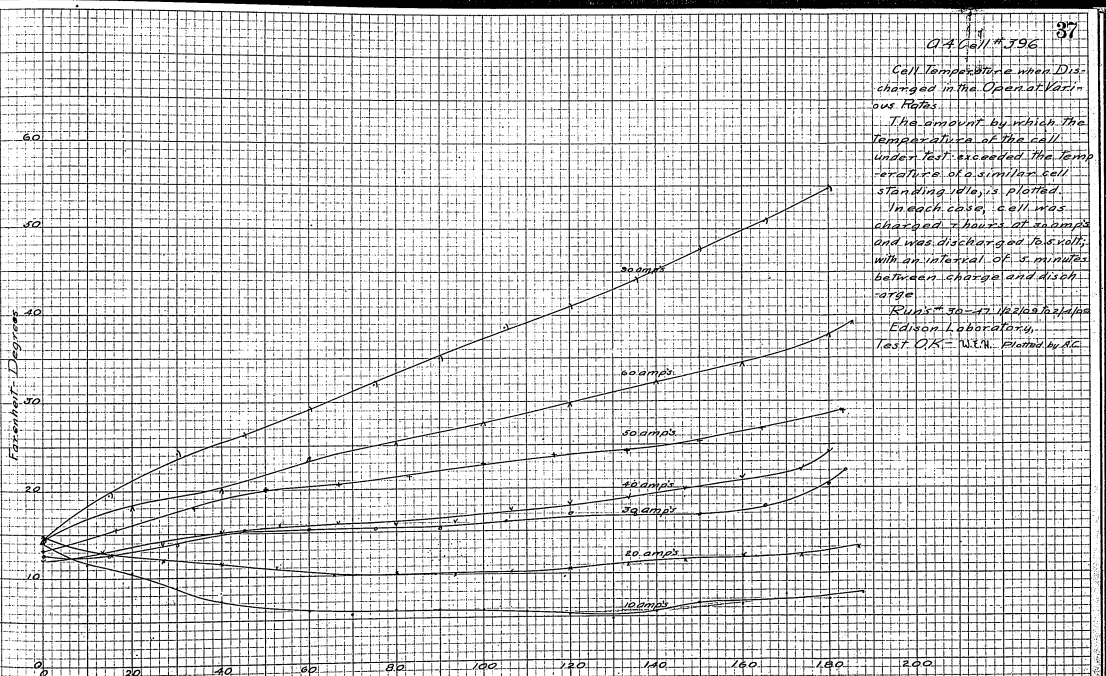
The amount by which the temperature of the cell under test exceeded the temperature of a similar cell standing idle, is plotted.

In each case, cell was charged 7 hours at 10 amps and was discharged to 1.8 volts with an interval of 5 minutes between charge and discharge.

Runs: 30-40-60-80-100-120 Amps

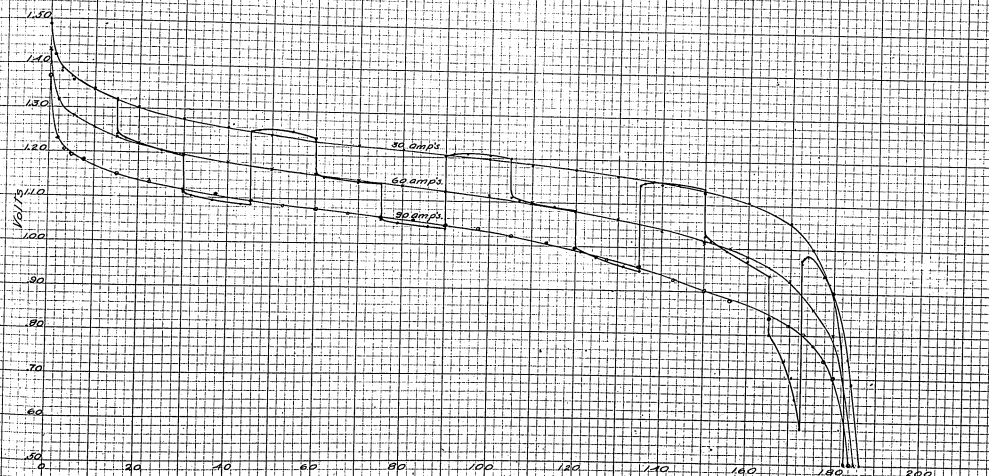
Edison Laboratory,

Test O.K.- W.F.H. Plotted by R.C.



A-4 Cell # 396

A Discharge at Successive Rates of 30, 60, and 90 Amperes, Compared with Continuous Discharges at Each of These Rates.
Black: Discharges at 30, 60, and 90 amperes successively.
Red: Discharges at 30, 45 and 41 at 30, 60 and 90 amperes respectively.
Charge: 7 hours at 30 amperes.
Edison Laboratory, 2/9/09. Test O.K. – W.E.H. Plotted by R.C.



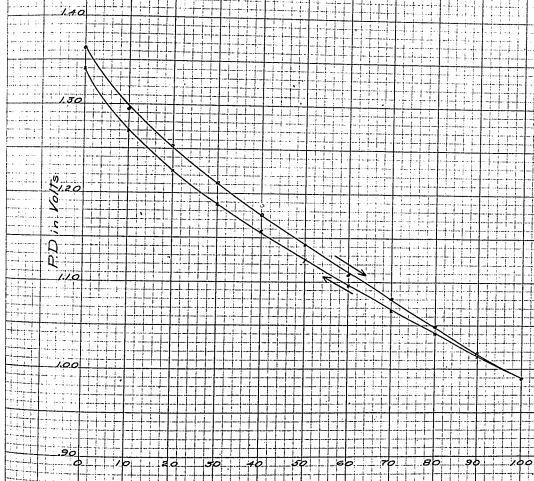
O.A. Cell #396

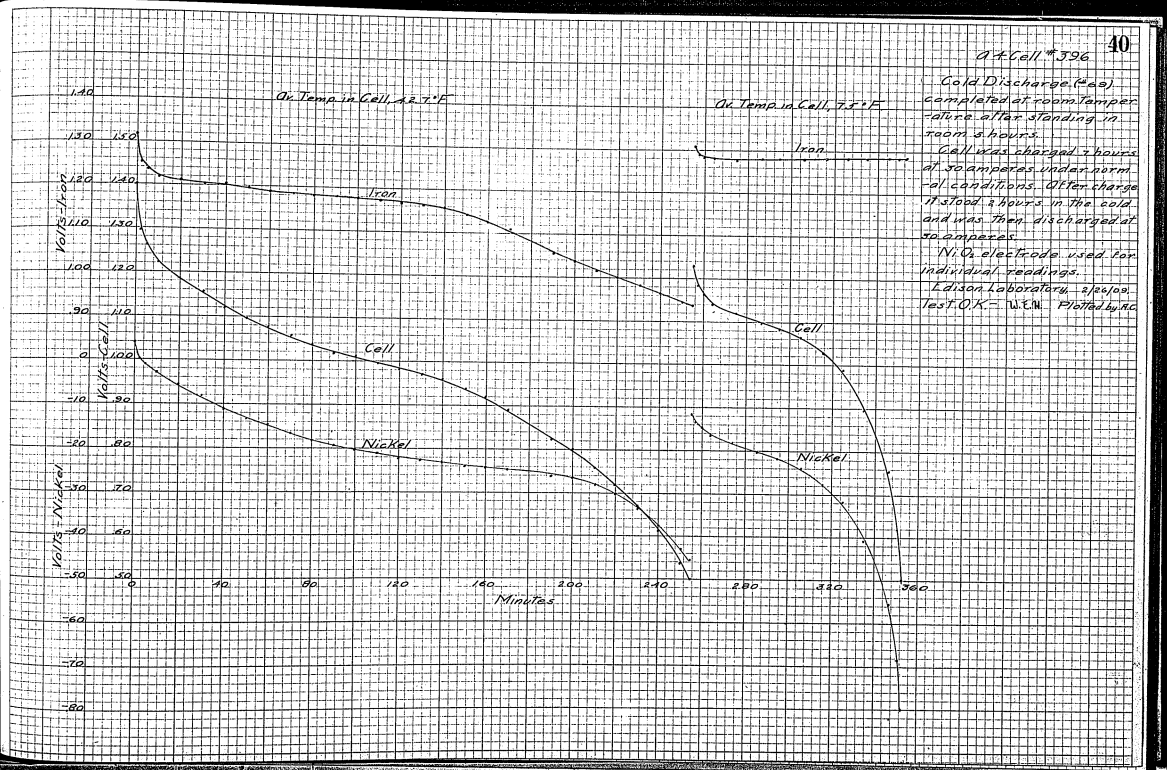
Average Potential Difference at Various Rates of Current Delivery: The temporary reading at terminals of a half-discharged cell when the current is increast. by steps and reduced again.

Run #55, 2/10/09. Charge: 7 hours at 30 amps. Cell was discharged 80 ampere-hours at 30-ampere rate before starting readings for this curve.

Cell Temperature: 90°F.

Edison Laboratory. Test O.K. – W.C.W. Plotted by A.C.





A.K. Cell #396

Cold Discharge. (#29) completed at room temperature after standing in room 5 hours.

Cell was charged 7 hours at 30 amperes under normal conditions. After charge it stood 2 hours in the cold and was then discharged at 30 amperes.

Ni. O. electrode used for individual readings.

Edison Laboratory. 2/20/09.

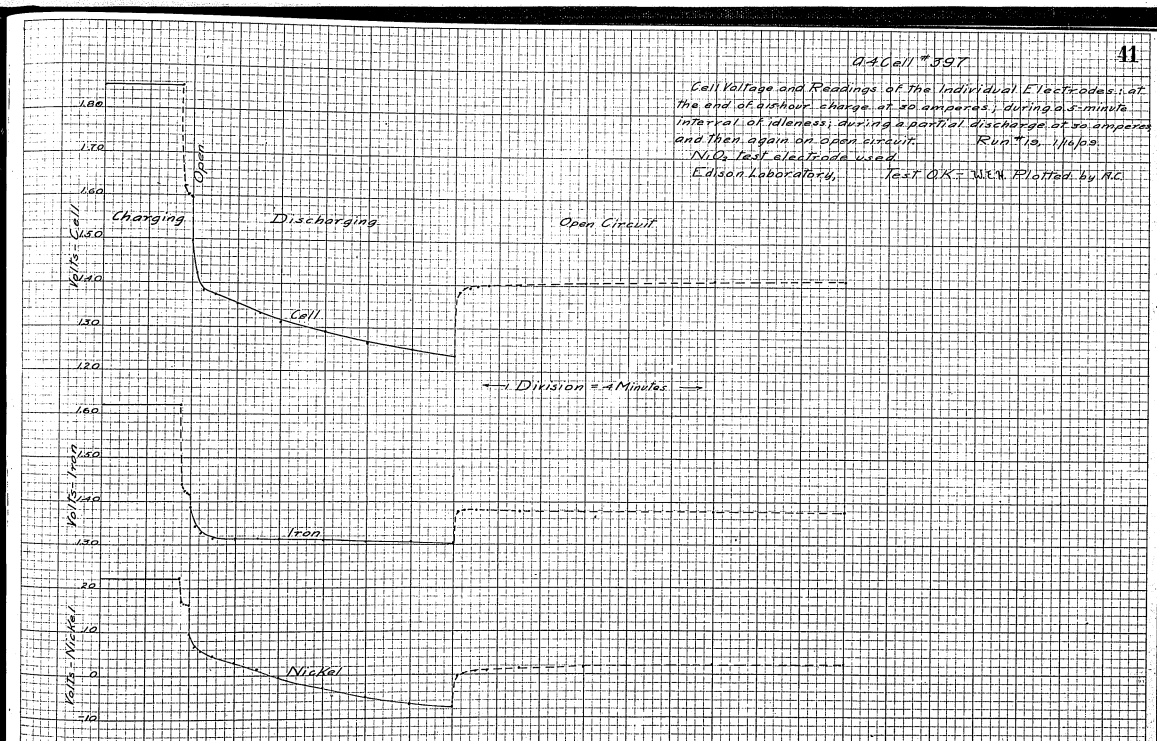
Tests O.K. – W.F.N. Plotted by R.C.

G-4 Cell # 397

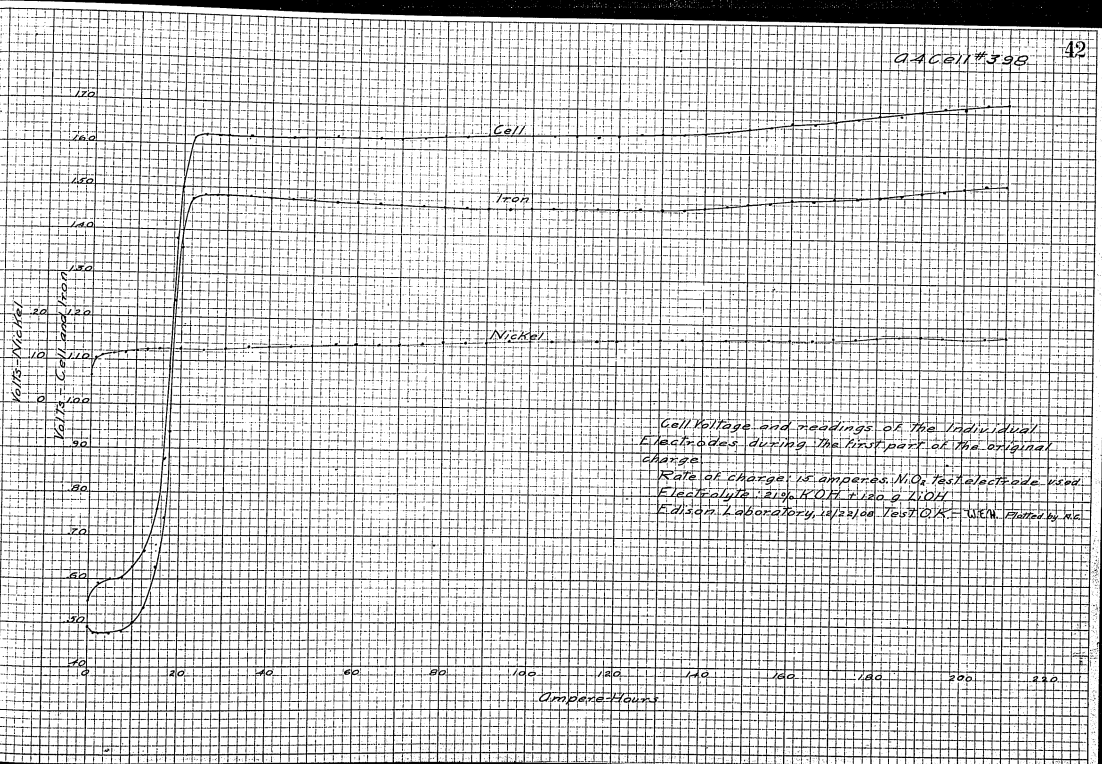
Cell Voltage and Readings of the Individual Electrodes: at the end of a 5 hour charge at 30 amperes; during a 3-minute interval of idleness; during a partial discharge at 30 amperes and then again on open circuit. Run #13, 1/16/09.

N.O. Test electrode used.

Edison Laboratory, Test O.K. - W.E.M. Plotted by M.C.



A4 Cell #398



Cell Voltage and readings of the Individual Electrodes during the first part of the original charge.

Rate of charge: 15 amperes. N.O. Test electrode used.

Electrolyte: 21% KOH + 120 g LiOH

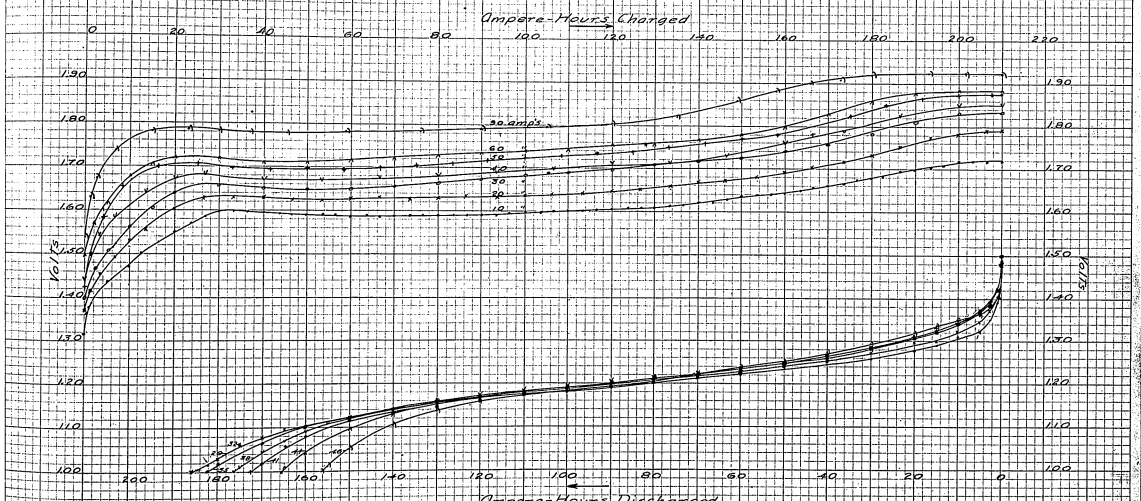
Edison Laboratory, 12/23/08 Test 10A — W.E.N. Plotted by R.C.

0.4 Cell #399

Efficiency Tests at Various Rates of Charge and Constant Rate of Discharge, always putting in 210 ampere-hours, and discharging at 30 amperes to 1.1 V.

Edison Laboratory, 11/30 to 12/6/09 Test O.K. - U.L.N. Planed by R.C.

Run	Charge		Av. Voltage		Output		Efficiencies		
			Charge	Discharge	Amp-hr	Watt-hr	Amp-hr	Volt	Watt-hr
•	20	21 hrs. @ 10 amp.	1.604	1.162	180	220.0	85.6	72.6	62.2
X	32	10½ " - 20 "	1.693	1.193	190	222.0	90.6	72.2	63.9
o	38	7 " - 30 "	1.692	1.197	182.5	218.4	86.8	70.7	61.4
V	38	5½ " - 40 "	1.713	1.202	176.2	212.0	83.9	70.2	58.9
+	41	4½ " - 50 "	1.742	1.203	172.5	207.5	82.1	69.1	56.7
^	44	3½ " - 60 "	1.758	1.207	165.7	199.9	78.8	68.6	54.1
□	46	2½ " - 90 "	1.822	1.213	130.5	159.0	74.5	66.6	49.6



O-A Cell #398

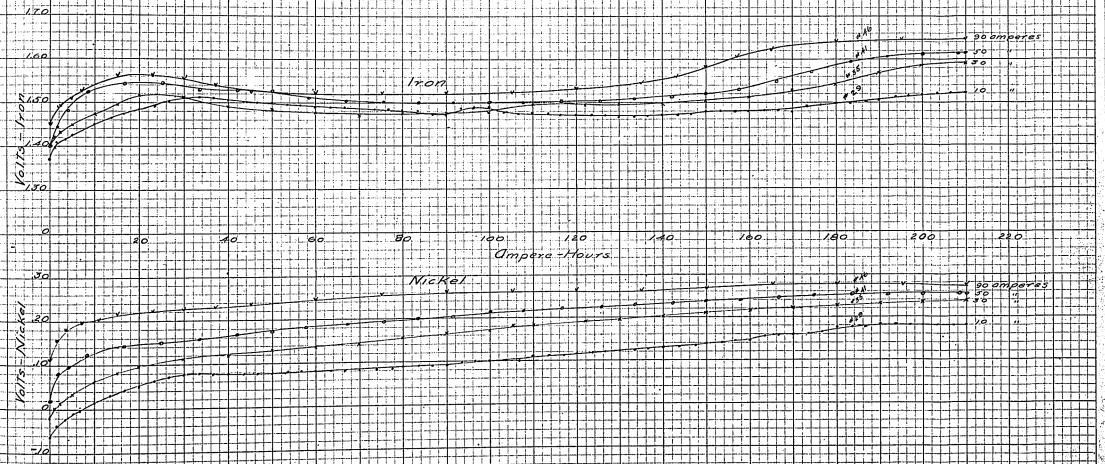
Readings of the Individual Electrodes on Charges at Various Rates.

NiO_2 Test electrode used

The Input in each case was 210 ampere-hours, and each charge succeeded a discharge to 1V at 30 amperes.

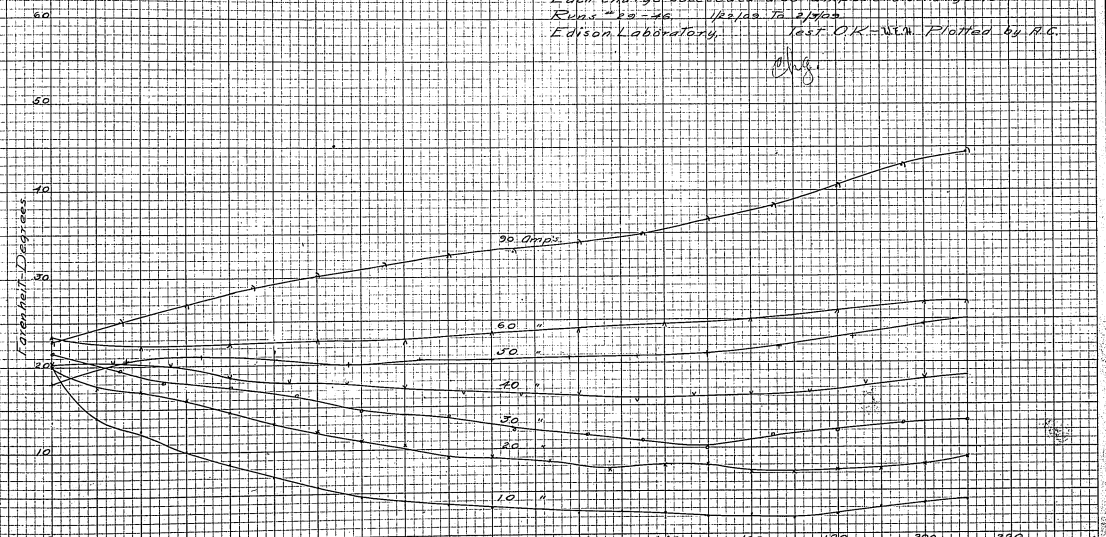
Runs #29-46, 1/12/09 to 2/2/09.

Edison Laboratory, Test O.K.—W.E.A. Plotted by A.C.



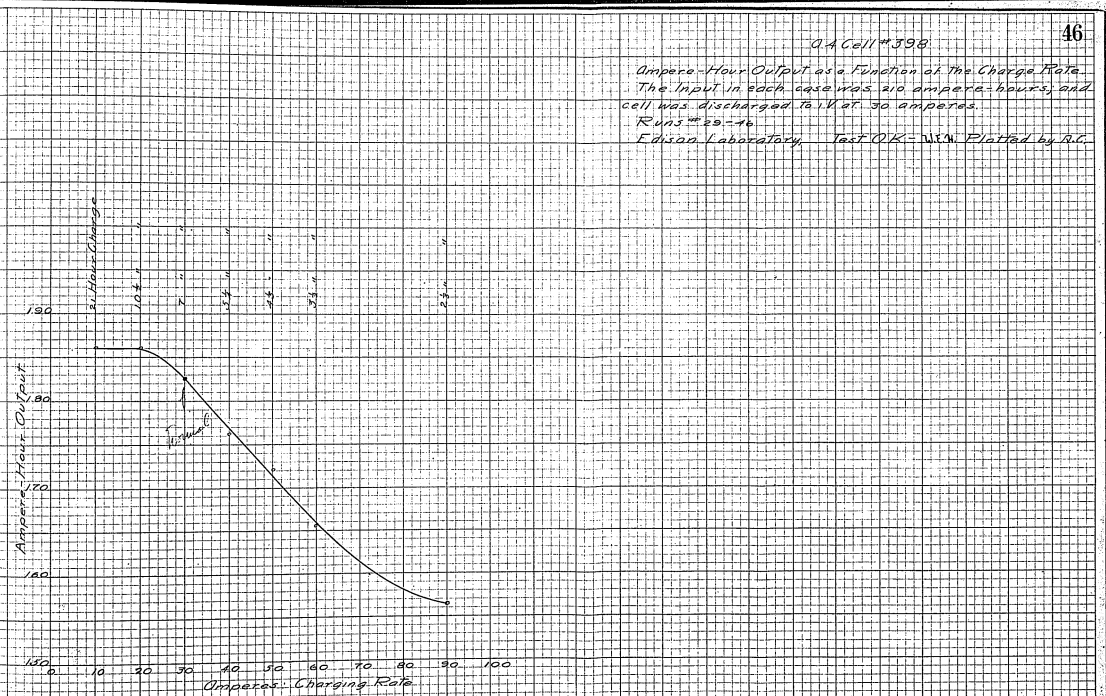
O.A. Cell # 398

Cell Temperature when Charged at Various Rates, in The Open.
The amount by which the temperature of the cell under test exceeded the temperature of similar cell standing idle, is plotted.
Each charge succeeded a 30-ampere discharge to 1V.
Runs 29 - 46 12/2/09 To 2/9/09
Edison Laboratory. Test O.K. - W.H. Plotted by A.C.



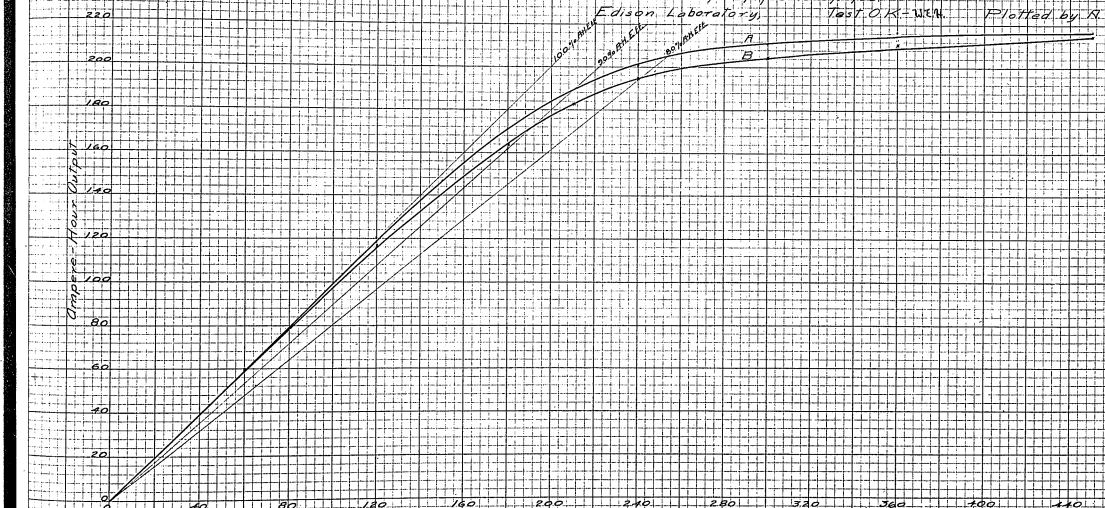
O.A Cell #398

Ampere-Hour Output as a Function of the Charge Rate.
The input in each case was 210 ampere-hours, and
cell was discharged to 1.V at 30 amperes.
Runs #29-46
Edison Laboratory. Test O.K - W.H. Plotted by R.C.



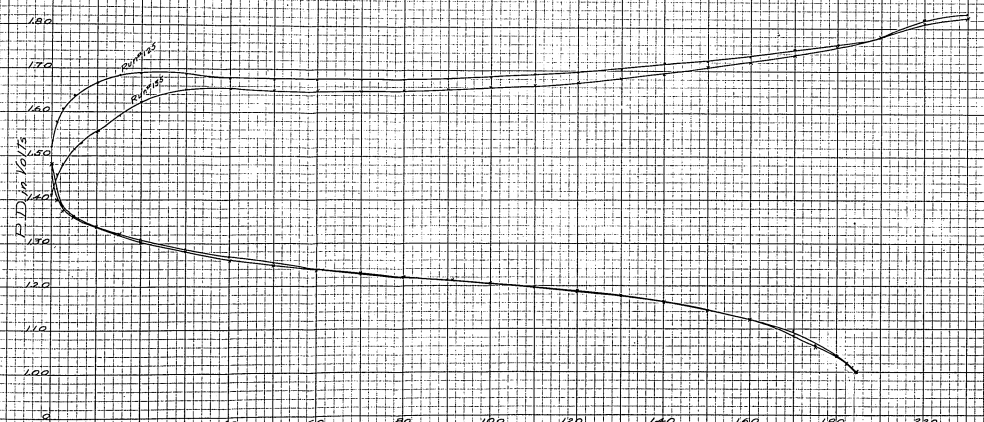
A4 Cell # 598

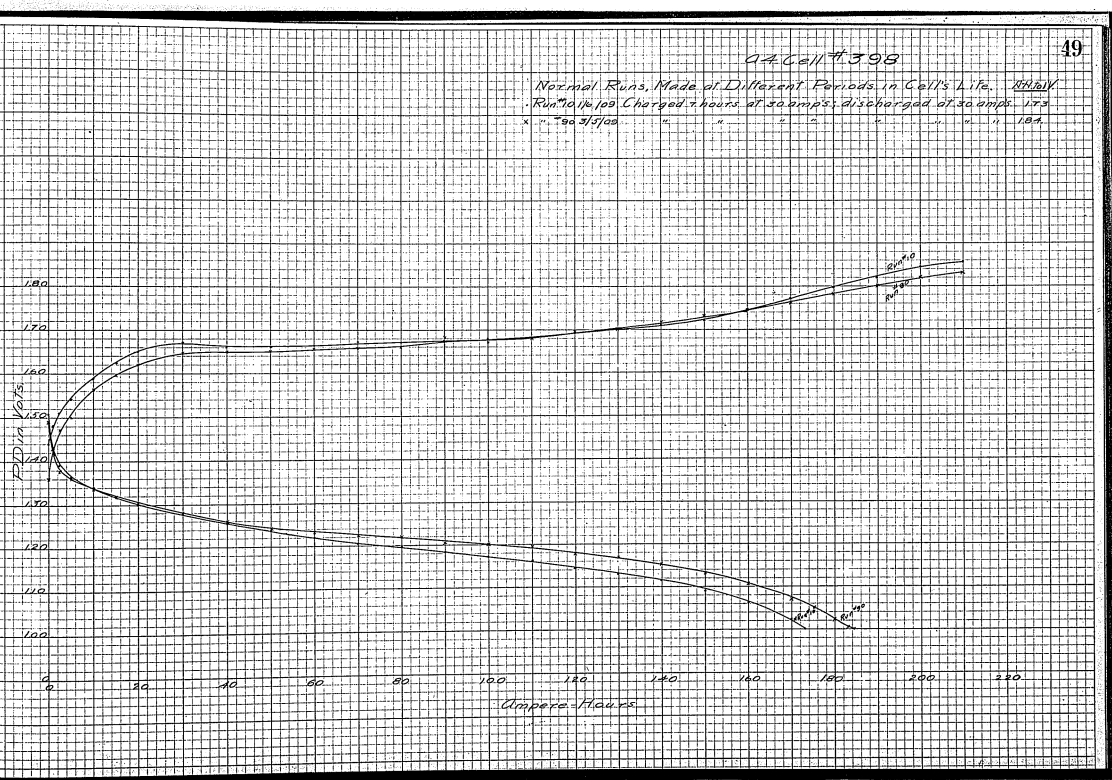
Relation of Output to Input, in Ampere-Hours.
Charge and discharge rate: 30 amps. Discharges terminated at 1 V.
Each point plotted is the average of two or three runs.
Curve A - Runs made with diminishing input.
Curve B - " " " increasing "
Runs # 51-101, 2/7/09 to 3/16/09.
Edison Laboratory. Test O.K. - W.H.W. Plotted by R.C.

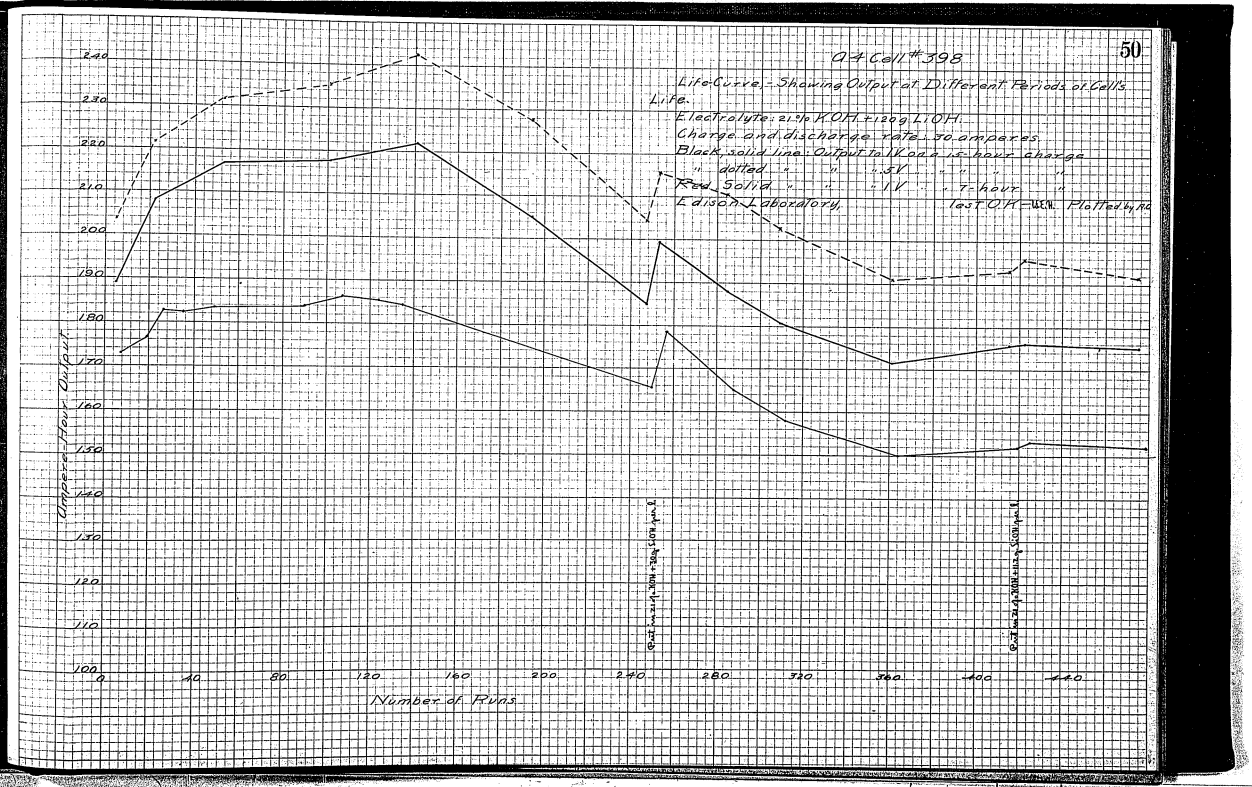


O-4 Cell #398

A Normal Rate Run Following a Period of Idleness,
Compared with Same Made Consecutively.
Cell charged 7 hours at 30 amperes and discharged
at 30 amperes.
Run #125, 4/15/09. After 38 hours of idleness
× " #135, 4/19/09. Made consecutively.
Edison Laboratory, Test O.K. J.F.W. Plotted by R.C.




Cell #398
Normal Runs, Made at Different Periods in Cell's Life. NH.Oil
Run No 10/14/09 Charged 7 hours at 30 amps; discharged at 30 amps. 175
" " 90 3/5/08 " " " " " " " " " " 184
Run No 10
Run No 90
Run No 1
Run No 90
EDiff Volts
180
170
160
150
140
130
120
110
100
0
20
40
60
80
100
120
140
160
180
200
220
Ampere Hours

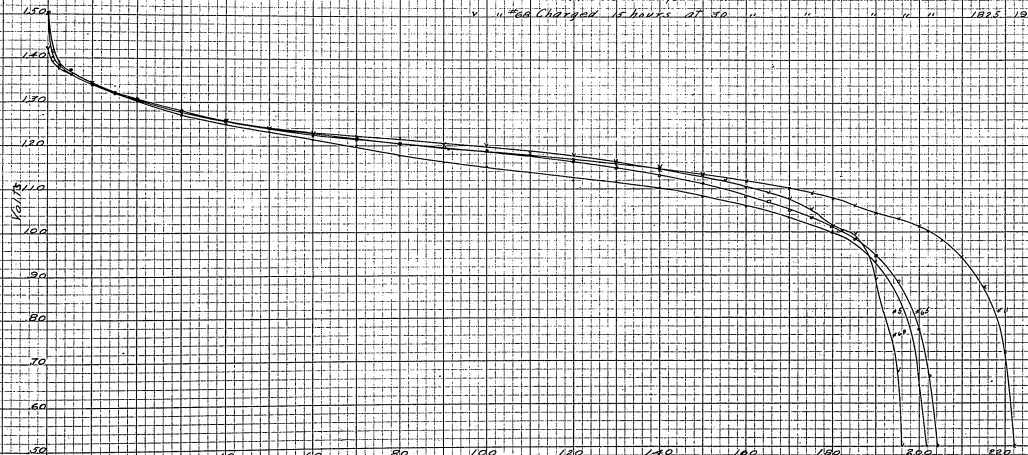

A-4 Cell #398
Life Curve - Showing Output at Different Periods of Cell's Life.
Electrolyte: 21% KOH + 1% LiOH
Charge and discharge rate 30 amperes
Black solid line: Output to 1.1 volts 5 hour charge
" dotted " " " .5V " " " "
Red Solid " " " 1V " 7 hour " "
Edison Laboratory. Test O.H. U.S.N. Plotted 4, 1
Ampere-Hour Output
Number of Runs
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
0
40
80
120
160
200
240
280
320
360
400
440

A 4 Cell Nº 400.

Electrolyte: 21% KOH + 120 g LiOH.

Gave 2 runs, charging 4 hours at 15 amps. and discharging at 90 and 30 amps; Then 2 normal overcharge runs.

			AMPERE-HOURS.	
·	Run Nº 5 Charged 4 hrs at 30 amperes, discharged at 30 amps		180.	201.5
	Gave 5 more normal overcharge runs			
x	" Nº 11 Charged 4 hrs at 30 amps,	discharged	" " "	202. 222.
	Gave 30 hot runs at 130° F.			
o	" Nº 65 Charged 15 hours at 30 amps,		" " "	181.2 204.3
	Put in fresh 21% KOH.			
v	" Nº 66 Charged 15 hours at 30 "		" " "	182.5 196.



A.H. Cell # 401

Electrolyte: 21% KOH + 120 g LiOH

	Run #	Charged at								Ampere Hours	
X	"	"	"	"	"	"	"	"	"	"	129	220.5
o	"	"	regular	"	"	"	"	"	"	"	135	212.2
+	"	"	"	"	"	"	"	"	"	"	180	208.5
V	"	12	"	"	"	"	"	"	"	"	204.5	221.6

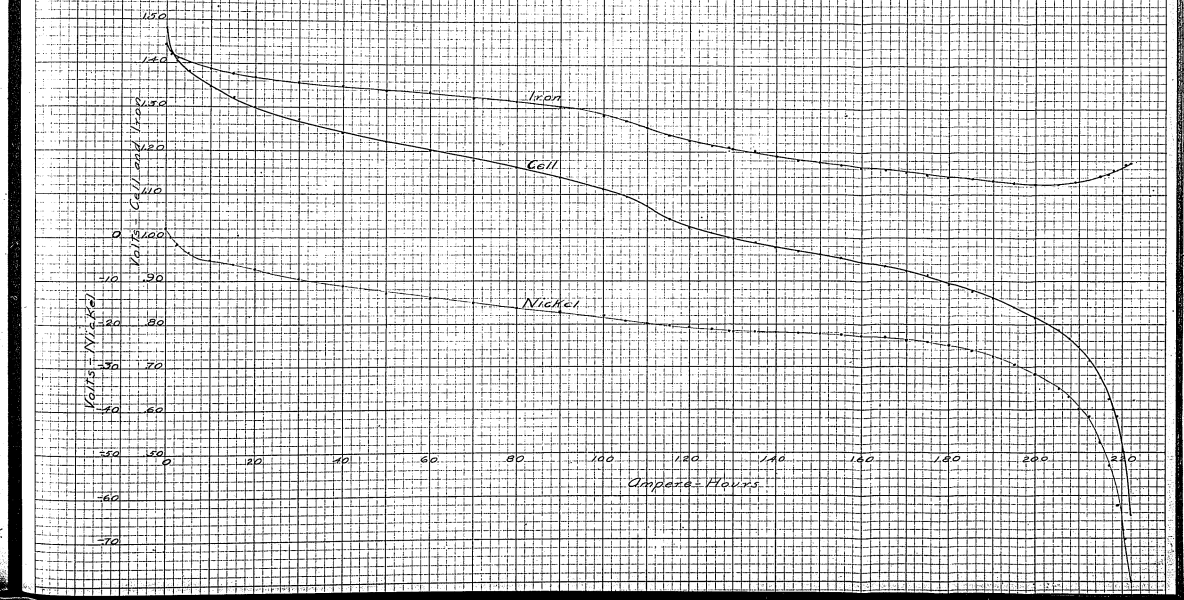
Edison Laboratory, Test O.K. - W.E.H. Plotted by A.C.

A-A Cell # 401

Readings of the Individual Electrodes on Discharge, after a Cold Charge.

Run # 3. Cell charged cold (est.) 7 hrs @ 30 amperes, and discharged normally at 30 amps.

Edison Laboratory, Upper Test OK — 1914 Plotted by K.C.

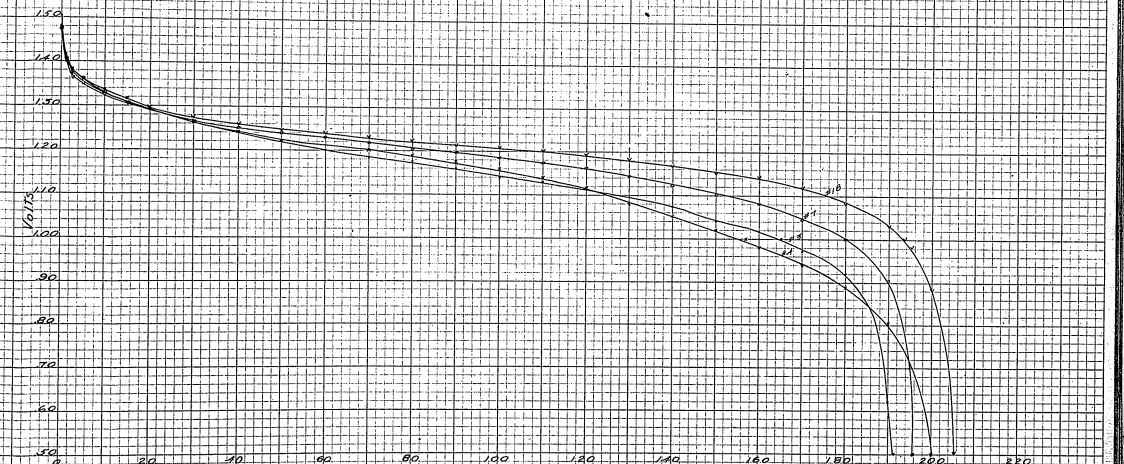


A-4 Cell "402

Electrolyte: 21.4% KOH + 1.2% LiOH

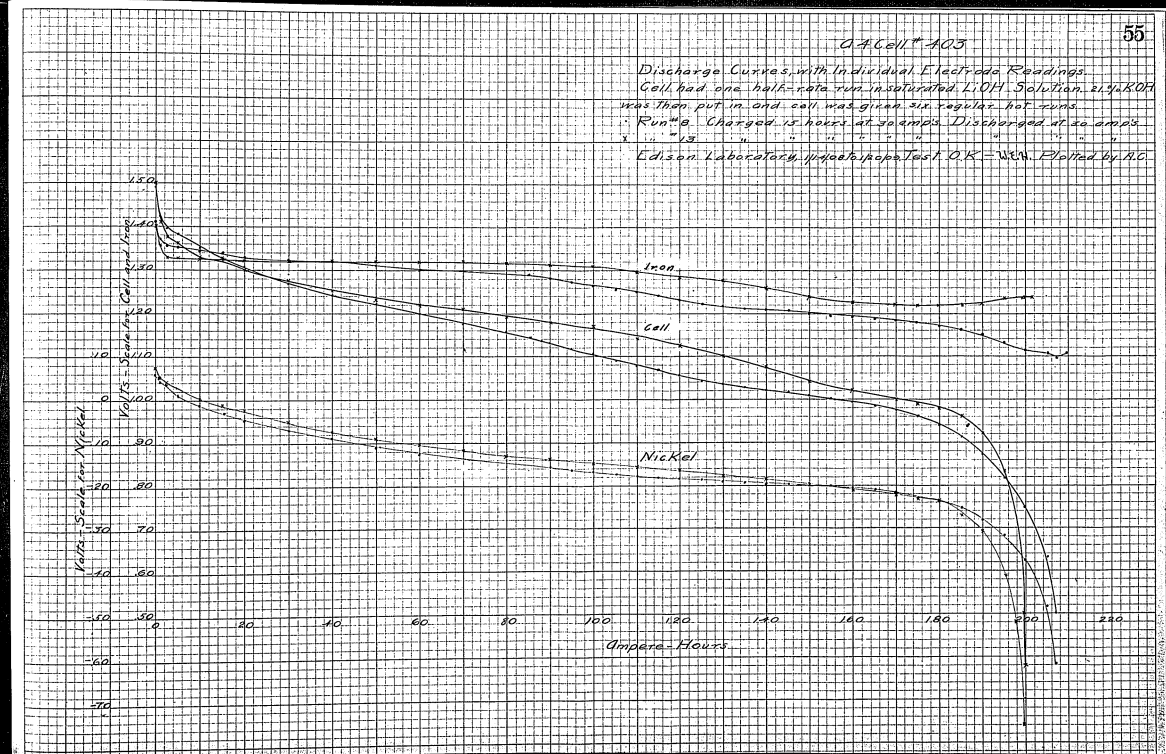
	A-H	Volt-AH
Run "3 Charged 15 hrs at 30 amps; discharged at 30 amps	165.	1912
Wash cell with 21.4% KOH — 4 changes in 12 days		
Run "4 Charged 15 hrs at 30 amps; discharged at 30 amps	157	200
" " 7 " " " " " " " " " 5 "	180	1962
Gave 5 hot runs and 3 normal overcharge runs.		
Run "8 Charged 15 hrs at 30 amps; discharged at 30 amps	193.5	205.

Edison Laboratory 12/15/08 to 11/1909 Test O.H. — W.C.H. Plotted by R.C.



O.A Cell # 403

Discharge Curves, with individual Electrode Readings.
Cell had one half-rate run in saturated 1.014 Solution, 21% KOH
was then put in and cell was given six regular hot runs.
Run # 8. Charged 15 hours at 30 amps. Discharged at 20 amps.
" " 13 " " " " " " " " "
Edison Laboratory, Upsala Road Test O.K. — W.H. Plotted by H.C.

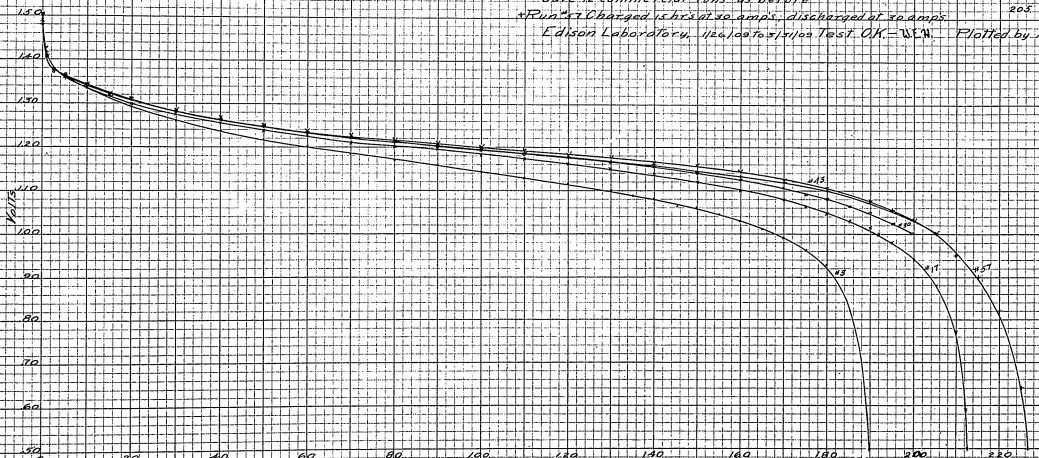


O A Cell # 404

Electrolyte: 21% KOH + 120 g LiOH

	O-H to 1V.	AH s.v
Run #3 Charged 15 hrs at 30 amps; discharged at 30 amps	167.5	190.
Gave 12 commercial runs - one per day, as in prec'ns		
Run #17 Charged 15 hrs at 30 amps; discharged at 30 amps	192.	213.2
Gave 12 commercial runs as before		
Run #30 Charged 15 hrs at 30 amps; discharged at 30 amps	199.7	
Gave 12 commercial runs as before		
Run #43 Charged 15 hrs at 30 amps; discharged at 30 amps	205.	
Gave 12 commercial runs as before		
Run #57 Charged 15 hrs at 30 amps; discharged at 30 amps	205.	226.5

Edison Laboratory, 11/26/09 to 3/11/10 Test. O.K. — W.C.H. Plotted by A.C.



04 Cell # 404

Life-Curve,- Showing Output at Different Periods in Cell's Life.

Electrolyte: 21% KOH + 120 g LiOH

Charge and discharge rate: 30 amperes.

Black solid line: Output to 1.1 on a 7-hour charge

Red " " " " " " 7 " "

Edison Laboratory, Test O.K - W.C.W. Plotted by H.C.

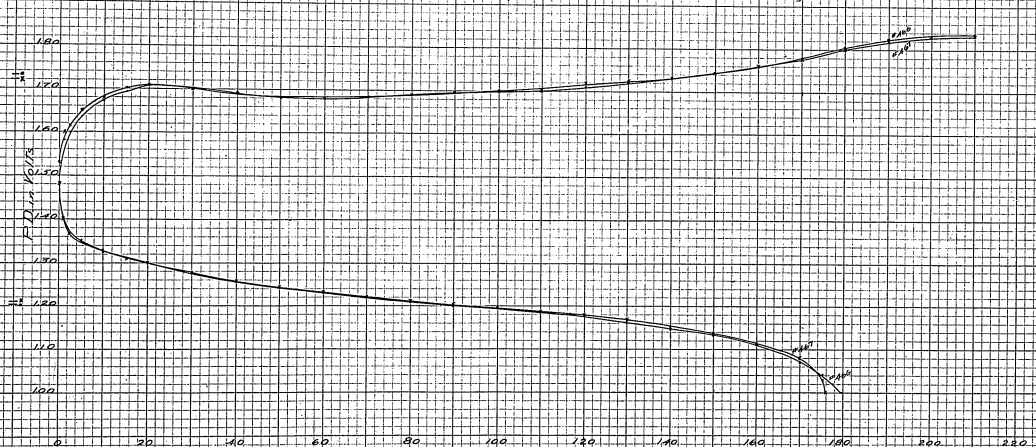
A Cells #466 and #467, (15.5 Pound Cells)

Run #51. Charged 7 hours at 30 amps. Discharged at 30 amperes.

	#466	#467		#466	#467
Ampere-Hour Input	210.0	210.0	Ampere-Hour Efficiency	85.5	85.8
" Output	179.5	176.0			
Average P.D. of Charge	1.731	1.721	Volt Efficiency	69.6	70.3
" " Discharge	1.203	1.210			
Watt-Hour Input	362.5	361.3	Watt-Hour Efficiency	59.4	59.0
" Output	216.0	213.1			

Watt-Hour Output per Pound #466 - 14.0; #467 - 13.78.

Edison Laboratory. 4/8/09 Test O.K. W.E.W. Plotted by H.C.



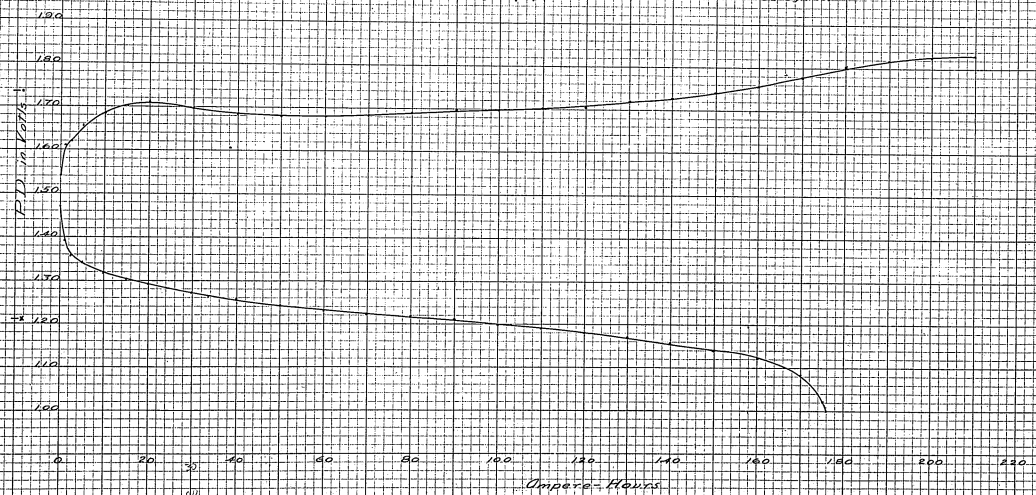
0.4 Cell # 468 (13.5 Pound Cell)

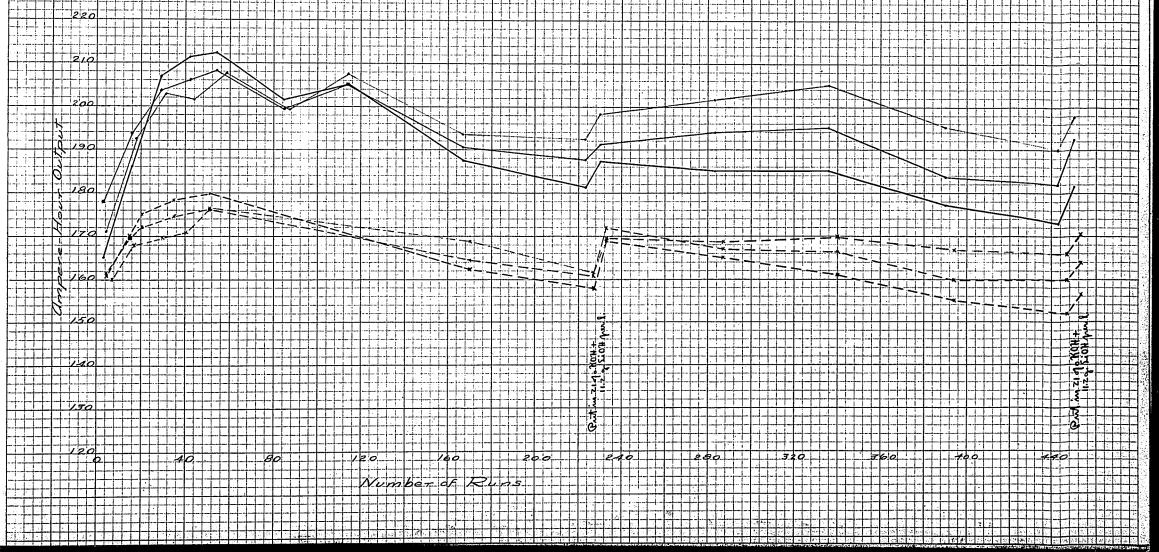
Run # 51. : Charged 7 hours at 30 amperes Discharged at 30 amp's.

Ampere-Hour Input	210.0	Ampere-Hour Efficiency	83.8%
" Output	176.0		
Average P.D. of Charge	1.734	Volt Efficiency	69.8%
" " Discharge	1.210		
Watt-Hour Input	364.1	Watt-Hour Efficiency	58.4%
" Output	213.0		

Watt-Hour Output per Pound = 15.77

Edison Laboratory 7/8/09 Test O.K. – W.C.W. Plotted by A.C.



O.A. Cells #466, #467, #468.

Life-Curves of Cells which had Different LiOH Treatments.
#466 (Black) Electrolyte: 21% KOH + 120 g LiOH.
#467 (Red) " " 21 " " + 10.0 g "
#468 (Green) " 6% KOH + 120 g LiOH for 3 runs, - then 25% KOH.
Output to 1.000 v hour charge (full line) and on 7 hour charge (dotted) is shown. Charge and discharge rate: 30 amperes.
Edison Laboratory. Test OK. - U.B. Plotted by R.C.